Medicine Quiz 9

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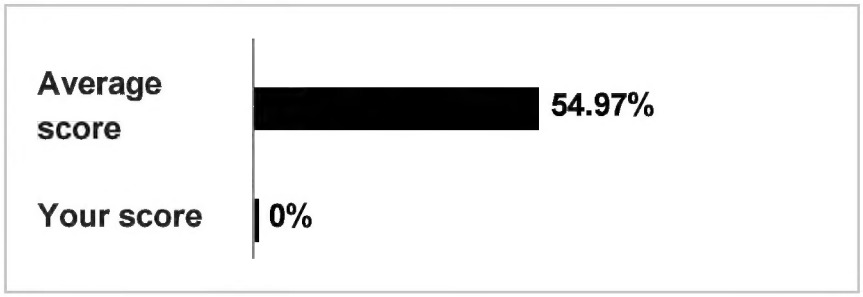

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Answered Review

1. Question **1 points**

A 50-year-old male presents to his physician complaining of daytime somnolence. He reports that yesterday, he fell asleep while stopped at a red light. His wife adds that he is a habitual snorer, and sometimes seems to stop breathing for seconds at a time while sleeping. His past medical history is significant for hypertension, a 25 pack-year smoking history, and a two beer per day drinking habit. Physical examination reveals an obese, middle-aged man in no apparent distress. His pulse is 88/min, blood pressure is 160/100 mm Hg, and respirations are 14/min. The remainder of the physical examination, including chest auscultation, is within normal limits. Which of the following is the most appropriate next step in the management of this patient?

1. Prescribe methylphenidate
2. Pulmonary function testing
3. MRI of the upper airways
4. Nocturnal polysomnography ✔
5. Dexamethasone suppression test

INCORRECT ✖

The correct answer is 4.

Based on his history, this patient likely has obstructive sleep apnea (OSA). Individuals with OSA exhibit perturbed respiratory patterns during sleep. Patients or their spouses will commonly note snoring and daytime sleepiness. Other complaints may include morning headaches, poor concentration, and restless sleep. OSA is most common in middle-aged males. Other risk factors include obesity and abnormalities of the upper airway (tonsillar hypertrophy, excessive soft tissue, micrognathia). Consequences of untreated OSA can include depression, hypertension, impotence, car pulmonale, and accidents related to day time somnolence. When OSA is suspected, nocturnal polysomnography is the gold standard for diagnosis.

(Choice 1) CNS stimulants such as methylphenidate are used to treat narcolepsy. Methylphenidate would improve the patient's daytime sleepiness, but would not address the underlying OSA.

(Choice 2) Pulmonary function testing is not used in the diagnosis of OSA, as affected patients tend to breathe normally while awake.

(Choice 3) MRI of the upper airways may be appropriate in preparation for uvulopalatopharyngoplasty (surgery for OSA). However, MRI cannot diagnose OSA, as not all patients with OSA have hypertrophy of the upper airway structures nor do all patients with hypertrophy of the upper airway structures have OSA. Surgery for OSA should only be considered when CPAP, oral appliances, and weight loss have proven ineffective.

(Choice 5) The dexamethasone suppression test can diagnose Cushing's syndrome. Affected patients classically exhibit central obesity, hypertension, a "buffalo hump," muscle wasting and thin skin. There is no indication that this patient's obesity is due to Cushing's.

2. Question

1 points

A 37-year-old male is being evaluated after a motor vehicle accident. He complains of right sided chest pain. Physical examination reveals mild bruising over the right chest wall, and is otherwise unremarkable. Chest x-ray shows no rib fractures but a solitary round lesion is seen in the right upper lobe of the lung. Upon further questioning the patient denies recent weight loss or appetite change. He has never smoked cigarettes. Which of the following is the most appropriate next step in the management of his lung lesion?

1. CT-guided biopsy
2. CT scan of the chest
3. Bronchoscopy
4. Obtain previous x-rays to compare ✔
5. Obtain whole body CT scan

INCORRECT ✖

The correct answer is 4.

An incidentally discovered solitary pulmonary nodule on radiographic imaging may be benign (infectious granuloma, hamartoma) or malignant (bronchogenic carcinoma, metastasis) in etiology. While biopsy is the only way to definitively determine whether a nodule is benign or malignant, clinicians may apply clinical and radiographic information to assess the likelihood of malignancy. Clinical characteristics favoring malignancy include age> 50, history of smoking, weight loss, and previous malignancy. Radiographic characteristics should also be considered. Large size, low density, spiculated borders, and absence of calcifications all favor carcinoma. Rate of lesion growth is an extremely important parameter. Malignant nodules tend to double in size between once a month and once a year. When possible, examination of previous chest x-rays is the best next step in the work-up of a patient with an incidental pulmonary nodule. If a previous chest x-ray demonstrates that the lesion has been stable in size for> 2 years, malignancy is effectively ruled out and no further testing is necessary.

(Choices 1 & 3) CT-guided biopsy and bronchoscopy are both methods of obtaining a tissue sample for definitive diagnosis. Bronchoscopy is best for biopsy of centrally-located lesions, while CT-guided percutaneous biopsy is best for peripheral lesions. Biopsy is warranted when clinical and radiographic data indicate an intermediate probability of malignancy.

(Choice 2) CT scan of the chest has greater sensitivity than chest x-ray for detecting pulmonary nodules, and also provides greater detail regarding a lesion's size, borders and density. Serial CT scans are performed at 3, 6, 9, 12, 18, and 24 months to follow nodules determined to have a low probability of malignancy, and for which previous radiographic studies are unavailable.

(Choice 5) Full body CT scan could provide staging information (nodal involvement, presence of metastases) in cases of malignancy. However, since this patient's cancer risk is very low, and total body imaging involves significant radiation exposure, there is no indication for full body CT here.

3. Question **1 points**

An obese 56-year-old female presents to her physician concerned that her asthma is worsening. She describes nighttime cough and wheezing that have been increasing over recent months. She also reports feeling tired each morning because she works late hours and has no time to relax after dinner. On review of systems, the patient denies dyspnea on exertion, but acknowledges that her throat has been sore lately. Her past medical history is significant for bronchial asthma, type 2 diabetes and hypertension. Her medications include an albuterol inhaler which she uses occasionally, lisinopril and aspirin. Her vital signs are within normal limits, and there are no abnormalities on physical exam. Which of the following is the most appropriate next step in the management of this patient?

1. Discontinue lisinopril
2. Discontinue aspirin
3. Add inhaled fluticasone
4. Add pantoprazole ✔
5. Add Benzocaine lozenges

INCORRECT ✖

The correct answer is 4.

Asthma and gastroesophageal reflux disease (GERO) can sometimes have similar presentations which can confuse physicians. Although this patient has a history of asthma, her pattern of symptoms suggests that GERO is responsible for her current problem. Importantly, her cough and wheezing occur at night but not during the day, a feature more consistent with GERO than asthma. Nighttime GERO is especially likely in people who eat dinner late in the evening and go straight to bed because the recumbent position favors reflux. Subsequent aspiration of gastric contents during sleep is very irritating to the upper and lower airways, and can cause sore throat, cough, and wheezing. Nighttime GERO can also cause the patient to wake in the middle of the night with symptoms similar to an asthma attack.

Initial treatment of GERO involves lifestyle modifications such as avoiding late evening meals and elevating the head of the bed. Patients may also be prescribed a trial of a proton pump inhibitor (PPI) for symptom relief, making pantoprazole the drug of first choice for this

patient.
(Choice 1) Lisinopril may induce cough, but is unlikely to produce strictly nocturnal symptoms.
(Choice 2) Aspirin is recommended for all diabetic patients for primary prevention of coronary and cerebrovascular events. While aspirin may cause GI upset in some, these symptoms would not be strictly nocturnal. Furthermore, most diabetic patients take a dose of aspirin so low (81 mg) that GI symptoms rarely result. A trial of a PPI should be attempted before discontinuing this patient's aspirin.
(Choice 5) Benzocaine lozenges can help to relieve sore throat symptoms, but do not eliminate the primary cause of the problem.

4. Question

1 points

A 66-year-old male presents to the emergency room with shortness of breath. The symptoms started one week ago with a dry cough and exertional dyspnea. His past medical history includes hypertension and recent stenting for double-vessel coronary artery disease. He was hospitalized six months ago for pneumonia. He has a 35 pack-year smoking history. His temperature is 37.2 C (98.9 F), blood pressure is 160/90 mmHg, and heart rate is 90 and regular. On examination, the patient is in mild respiratory distress, but he can speak in full sentences. Chest auscultation reveals decreased breath sounds at the lung bases, bilateral crackles and occasional wheezes. His ABG shows:

pH: 746
pO_2: 73 mmHg
pCO_2: 31 mmHg

Which of the following is the most likely explanation for this patient's symptoms?

1. Congestive heart failure ✔
2. COPD exacerbation
3. Pulmonary embolism
4. Pneumothorax
5. Adult respiratory distress syndrome

INCORRECT ✖
The correct answer is 1.
The patient described is most likely suffering from an exacerbation of congestive heart failure (CHF). The patient's history of coronary artery disease puts him at risk for heart failure due to left ventricular dysfunction. Uncontrolled hypertension and his smoking history are risk

factors for coronary vascular disease in this patient. On pulmonary examination, patients with worsening CHF will commonly have bibasilar crackles. Decreased breath sounds at the bases could be due to pleural effusions from CHF. Wheezing can occasionally be present in heart failure (cardiac asthma). It is also a possibility that this patient may have concomitant COPD. The blood gas findings show hypoxia, hypocapnia, and respiratory alkalosis; these are highly suggestive of CHF compared to COPD. More specific testing for CHF would include assessment of the B-type natriuretic peptide (BNP) and the pulmonary capillary wedge pressure.
(Choice 2) In COPD exacerbation, examination typically shows widespread bilateral wheezes, and ABG findings include respiratory acidosis and hypoxia.
(Choice 3) Pulmonary embolism presents with acute-onset dyspnea, tachypnea, and pleural chest pain. Patients have hypoxemia and respiratory alkalosis with a widened A-a oxygen gradient.
(Choice 4) Pneumothorax typically presents with acute-onset pleuritic chest pain and dyspnea when it is symptomatic. Physical examination reveals hyperresonance to percussion, diminished tactile and vocal fremitus, and decreased or absent breath sounds in the affected area.
(Choice 5) Adult respiratory distress syndrome can have a very similar presentation but the history and risk factors suggest CHF as the most likely diagnosis.

5. Question **1 points**

A 45-year-old female presents to the emergency department because of increasing somnolence and shortness of breath. Her past medical history is significant for hyperlipidemia, hypertension and type 2 diabetes. She has never smoked and does not use drugs or alcohol. Her temperature is 36.7°C (98°F), blood pressure is 160/80 mm Hg, pulse is 80/min, and respirations are 16/min. Her BMI is 55 kg/m2. On physical examination, she is drowsy but able to respond to commands. Jugular venous distention is difficult to visualize due to a thick neck. Lungs are clear to auscultation. Heart sounds are distant. Abdomen is obese and non-tender. Lower extremities have edema bilaterally. There are no obvious focal deficits on neurologic examination. Chest x-ray is poor in quality but no obvious abnormalities are noted. EKG shows low voltage QRS complexes but no significant ST-segment or T-wave abnormalities. Laboratory studies show:

Complete blood count
Hemoglobin: 16 0 g/L
Hematocrit: 48%
Mean corpuscular volume: 85 fl
Platelet count: 224,000/mm^3
Leukocyte count: 6,600/mm^3

Arterial blood gas
pH: 7.30
pO_2: 60mm Hg
pCO_2: 69mm H

Which of the following is the most likely cause of her condition?

1. Impaired chest wall compliance ✔
2. Respiratory muscle weakness
3. Pneumocystis pneumonia
4. Wegener's granulomatosis
5. Pulmonary edema

INCORRECT ✖

The correct answer is 1.

This is a patient with severe obesity (greater than 150% of ideal body weight) and alveolar hypoventilation during wakefulness. Taken together, these findings point to a diagnosis of Obesity Hypoventilation Syndrome (OHS), also known as Pickwickian syndrome. Patients with OHS classically demonstrate extreme obesity (BM1=55, nl 18.5-24.9), a thick neck, and hypersomnolence. The patient's distant heart sounds, low voltage ORS complexes on EKG, and poor quality chest x-ray are all findings consistent with obesity. This patient also has polycythemia secondary to alveolar hypoventilation, another common finding in OHS. The leg edema noted on physical exam may be a sign of right heart failure.

This patient's ABG reveals respiratory acidosis (normal pH is 7 .35- 7.45), hypercapnia, and hypoxemia (normal P02 is 70-100). In OHS, derangement of the ABG is usually a consequence of decreased lung compliance **(Choice 1)**, which occurs secondary to increased pulmonary blood volume and resultant engorgement of the pulmonary capillaries. Decreased lung compliance leads to increased work of breathing. Eventually, the work of breathing becomes so high that the CNS chemoreceptors establish a higher pCO_2 set-point, causing resultant hypoventilation, hypercapnia and hypoxemia. Respiratory muscle weakness **(Choice 2)** also occurs in many OHS patients, but it is not the major cause of the clinical findings.

6. Question

1 points

A 60-year-old male with a history of hypertension, diabetes, coronary artery disease, asthma, and cigarette smoking undergoes emergent laparotomy for a perforated peptic ulcer. He receives 4 liters of intravenous normal saline intraoperatively. Following the procedure, he is extubated without complication, but subsequently develops respiratory distress. Immediate arterial blood gas analysis on room air shows:

PaO_2: 60
pH: 746
$PaCO_2$: 37

HCO_3– : 22

His temperature is 37.2 °C (98.9 °F) and blood pressure is 126/76 mm Hg. Lung auscultation reveals bilateral rales. His arterial blood gas fails to improve with administration of 100% oxygen. What is the most likely cause of his respiratory distress?

1. Excessive anesthesia
2. Pulmonary edema ✔
3. Pulmonary embolism
4. Aspiration pneumonia
5. Exacerbation of bronchial asthma

INCORRECT ✖

The correct answer is 2.

This patient has hypoxemia (P_aO_2 < 80). Disorders that cause hypoxemia can be broken down into four categories: hypoventilation, decrease in inspired oxygen, shunting, and V/Q mismatch. By analyzing the arterial blood gas (ABG), calculating the alveolar-arterial oxygen gradient (A-a gradient), and determining whether administration of 100% oxygen leads to improvement, one can determine the specific type of hypoxemia plaguing a particular patient. The characteristics of each category of hypoxemia are as follows:

1. Hypoventilation presents with an elevated P_aCO_2 with a normal A-a gradient.
2. Low inspired oxygen presents with a normal P_aCO_2 plus normal A-a gradient.
3. Shunting presents with a normal P_aCO_2 and elevated A-a gradient that does not correct with administration of 100% oxygen.
4. V/Q mismatch presents with a normal P_aCO_2 and elevated A-a gradient that does correct with Oxygen.

Hypoventilation is a potential surgical complication in cases where excessive anesthesia **(Choice 1)** has been used, but is not the explanation for the hypoxemia in the patient above as the $PaCO_2$ is not elevated. The next step is to calculate the A-a gradient ($P_AO_2 – P_aO_2$). PaO_2 is the measured value of arterial oxygen obtained by ABG (60 in this case), and PAo2 refers to the alveolar oxygen value. PAo2 is calculated using the following equation:

$P_AO_2 = FiO_2 (760\text{-}47) – PaCO_2/0\ 8$

$P_AO_2 = (0.21*713)\text{-}(37/0.8) = 150\text{-}46 = 104$

Then, to calculate the A-a gradient:

A-a gradient = $P_AO_2 – P_aO_2 = 104\text{-}60 = 44$

A normal A-a gradient is < 15 in a young person. Values increase with age, but an A-a gradient >30 is considered elevated regardless of age. The fact that this patient has an elevated A-a gradient leaves only shunting and V/Q mismatch as potential explanations for his condition. His failure to improve with 100% oxygen rules out V/Q mismatch, as might occur in the case of pulmonary embolism **(Choice 3)** or exacerbation of bronchial asthma **(Choice 5)**, leaving shunting to explain his hypoxemia. Common causes of shunting include pulmonary edema, pneumonia, and vascular shunt. This patient is afebrile, making aspiration

pneumonia **(Choice 4)** unlikely. His many risk factors for myocardial infarction and decreased left ventricular function (hypertension, diabetes, coronary artery disease, and recent blood loss/surgery) make pulmonary edema **(Choice 2)** the most likely explanation for his ABG abnormalities and rales on pulmonary exam.

7. Question

1 points

A 40-year-old man presents to the emergency room with shortness of breath, cough and hemoptysis for the past two days. He says he has never had symptoms like these before. His medical history is significant for a non-healing leg ulcer and chronic purulent nasal discharge. He has smoked a pack of cigarettes daily for the past 20 years. On physical examination, his temperature is 37.6 °C (99.7 °F), blood pressure is 130/90 mm Hg, pulse is 94/min and respiratory rate is 18/min. Lung auscultation reveals patchy rales bilaterally. Heart sounds are regular. A 2×3 cm ulcer with rolled, undermined borders is noted on the right lower leg. Which of the following is the most likely explanation for his hemoptysis?

1. Pulmonary tuberculosis
2. Bronchogenic carcinoma
3. Wegener's granulomatosis ✔
4. Mitral stenosis
5. Pulmonary embolism

INCORRECT ✖

The correct answer is 3.

Wegener's granulomatosis is defined clinically as the triad of systemic vasculitis, upper and lower airway granulomatous inflammation, and glomerulonephritis. Disease onset is usually around age 40, with men and women equally affected. The upper respiratory tract is the most common site of involvement and symptom presentation. Granulomatous inflammation in the nasopharynx causes epistaxis, purulent rhinorrhea, otitis, sinusitis and, over time, saddle nose deformity due to destruction of the nasal cartilage. Cutaneous manifestations are varied and include painful subcutaneous nodules, palpable purpura, and/or pyoderma gangrenosum-like lesions as in the patient described above. Laboratory testing typically demonstrates a positive C-ANCA due to antibodies against proteinase-3 and an elevated CRP. Urinalysis shows RBC casts, proteinuria and sterile pyuria if glomerulonephritis is present. Treatment is with cytotoxic agents such as cyclophosphamide.

(Choice 1) Pulmonary tuberculosis can cause hemoptysis and cutaneous findings, including Scrofuloderma overlying infected lymph nodes, a facial eruption known as lupus vulgaris and others. Nasal destruction is more typical of leprosy than cutaneous tuberculosis.

(Choice 2) Bronchogenic carcinoma may cause hemoptysis but is not commonly associated with ulcerative diseases of the skin.
(Choice 4) Severe mitral stenosis can cause hemoptysis, but associated dyspnea, fatigue, orthopnea and paroxysmal nocturnal dyspnea would also be expected.
(Choice 5) Pulmonary embolism may cause hemoptysis, but associated acute-onset dyspnea and chest pain would also be expected.

8. Question

1 points

A 46-year-old male is hospitalized with severe acute pancreatitis. Because of progressive respiratory difficulty, he is intubated and placed on mechanical ventilation. His weight is 70 kg (152 lb), blood pressure is 110/70 mmHg, and heart rate is 90/min. Chest x-ray shows patchy opacities bilaterally, consistent with pulmonary edema. His current ventilator settings are: assist control mode, respiratory rate of 12/min, tidal volume of450 ml, FiO2 of40%, and positive end-expiratory pressure (PEEP) of 5 cm H_2O. His blood gas readings are:

pH: 7.51
pCO_2: 22 mmHg
pO_2: 121 mmHg

Which of the following is the best next step in managing this patient?

1. Bronchodilator therapy
2. Decrease FiO2
3. Decrease respiratory rate ✔
4. Increase tidal volume
5. Incentive spirometry

INCORRECT ✖
The correct answer is 3.
The assist control mode of mechanical ventilation delivers a predetermined tidal volume with every breath. Inspiratory cycles can be initiated by the patient, but if the patient fails to breathe at a set minimum rate, then the ventilator will deliver the tidal volume on its own. In general, tidal volumes should be about 6 ml/kg of ideal body weight; thus, the tidal volume being administered to the patient above is appropriate. However, the arterial blood gas reveals an increased pH (> 7.4) and decreased pCO_2, consistent with respiratory alkalosis secondary to hyperventilation. Thus, decreasing the respiratory rate would be the most appropriate next step in his management.

(Choice 1) Bronchodilator therapy is useful in patients with obstructive lung disease to help conduct inspired air from the trachea to the alveoli. This patient is not hypoxic and does not appear to be having difficulty with ventilation.
(Choice 2) The FiO2 setting of 40% is appropriately low to avoid oxygen toxicity in this patient.
(Choice 4) Increasing the tidal volume would increase ventilation and worsen the patient's respiratory alkalosis.
(Choice 5) Incentive spirometry is utilized to prevent atelectasis in bed-bound patients, particularly following surgical procedures. It has no role in the treatment of intubated, mechanically ventilated patients.

9. Question

1 points

A 69-year-old male presents to the ER with severe shortness of breath for the past 12 hours. He reports that he has used his albuterol inhaler many times without relief. On review of systems he notes having had a mild fever yesterday that resolved with acetaminophen. The patient quit smoking 2 years ago but has a 100 pack year smoking history. On physical examination, his blood pressure is 150/90 mmHg and heart rate is 110/min. The patient is using accessory muscles of respiration. Expirations are prolonged, and there are wheezes bilaterally. Arterial blood gas (ABG) analysis reveals the following:
pH: 7.36
pO_2: 64 mmHg
pCO_2: 57 mmHg
HCO_23: 32 mEq/L

The patient is treated with ipratropium and albuterol nebulizers and moxifloxacin. Which of the following additional therapies is most likely to benefit this patient?

1. Corticosteroids ✔
2. Loop diuretic
3. Mucolytic agents
4. Aminophylline
5. Diltiazem

INCORRECT ✖
The correct answer is 1.
This elderly former smoker presents with acute dyspnea accompanied by fever, bilateral wheezes, prolonged expirations and accessory muscle use. His ABG is consistent with chronic respiratory acidosis (in chronic respiratory acidosis, HCO_3– is expected to increase

by 3.5 mEq/L for every 10 mmHg increase in pCO_2). This presentation is most consistent with an acute COPD exacerbation due concomitant infectious bronchitis. Treatment for an acute COPD flare involves bronchodilators (including a β-adrenergic agonist such as albuterol), antimuscarinics (ipratropium), and broad-spectrum antibiotic coverage. A two week oral corticosteroid taper is also recommended because it is proven to shorten hospital stays and prolong intervals between exacerbations. Corticosteroids are likely beneficial because they reduce inflammation and reactive edema in the bronchial mucosa. Supplemental oxygen may also be of benefit, though care must be taken when administering oxygen to chronically hypoxic patients because it can suppress their hypoxia-fueled respiratory drive.
(Choice 2) In contrast to the dyspnea of CHF, dyspnea in COPD is not due to pulmonary edema and is thus not helped by diuretics.
(Choice 3) Airway obstruction in COPD is mainly due to infectious/inflammatory mucosal edema, bronchial smooth muscle hypertrophy and bronchial submucosal gland hyperplasia. Thus, mucolytics would not be expected to have significant therapeutic benefit.
(Choice 4) Aminophylline and Methylxanthines are bronchodilators used in the treatment of asthma, a condition marked by airway obstruction due to reversible bronchoconstriction.
(Choice 5) While diltiazem can have bronchodilatory actions, it is not commonly used in the treatment of asthma or COPD.

10. Question

1 points

A 28-year-old male presents to the physician's office for a routine health maintenance examination. He has a two year history of bronchial asthma for which he uses an albuterol inhaler. He states that he experiences asthma symptoms an average of 2 times per week, for which his albuterol inhaler provides relief. He has not had nighttime awakenings over the past month. He does not use tobacco, alcohol or illicit drugs. His family history is significant for asthma in his grandfather. Physical examination is unremarkable. Which of the following is the most appropriate next step in his management?

1. Add long-acting β2 agonist inhaler
2. Add inhaled corticosteroids
3. Add oral theophylline
4. Add oral prednisone
5. Continue current medical regimen ✔

INCORRECT ✖

The correct answer is 5.
The management of asthma varies depending on symptom severity. Asthma is classified into four categories: intermittent, mild persistent, moderate persistent, and severe persistent. The category is determined by assessing the frequency of a patient's daytime symptoms, nighttime awakenings, and use of short-term β2-agonists, plus pulmonary function testing. In intermittent asthma, daytime symptoms occurs ≤ 2 days/week, nighttime awakenings ≤ 2x/month, use of β2-agonists ≤ 2x/week, baseline FEV1 and FEV1 /FVC are normal, and there are no limitations on daily activities. The above vignette describes a patient with intermittent asthma. The appropriate pharmacologic management for intermittent asthma is a short acting bronchodilator (e.g. albuterol) for as needed (PRN) use, with no need for daily controller medication. Since the patient is already using an albuterol inhaler, he should simply continue his current medical regimen.
(Choice 1) In addition to a PRN albuterol inhaler and low-dose inhaled corticosteroid, patients with moderate persistent asthma (daily symptoms, weekly nighttime awakenings, and FEV1 60-80% of predicted) should be prescribed a long-acting inhaled β2 agonist inhaler.
(Choice 2) In addition to a PRN albuterol inhaler, patients with mild persistent asthma (symptoms >2 days/week but less than daily, nighttime awakenings 3-4x/month, minor limitation of activities, and normal PFTs) should be prescribed a low-dose inhaled corticosteroid as a controller medication.
(Choice 3) Theophylline is a methylxanthine phosphodiesterase inhibitor that causes bronchodilation. Though its use is limited somewhat by its side effect profile, it is occasionally used as the controller medication in persistent asthma.
(Choice 4) Patients with severe persistent asthma (symptoms throughout the day, frequent nighttime awakenings, extremely limited activity, and FEV1 <60% predicted) should receive a PRN albuterol inhaler, long-acting β2-agonist inhaler, and high-dose inhaled corticosteroids. Oral prednisone can also be used in cases of severe persistent asthma.

11. Question **1 points**

A 25-year-old female presents to the emergency department with sudden-onset severe shortness of breath and wheezing. She has a history of asthma. On examination, she is unable to speak in full sentences and is using accessory muscles of respiration. She is intubated, mechanically ventilated and treated with continuous albuterol nebulization and intravenous methylprednisolone. Within six hours, her condition is improved. She is extubated and treated with hourly nebulizer treatments. The next morning, she complains of muscle weakness. On physical examination, she has difficulty lifting her arms over her head and mild hand tremors. Her vital signs are stable. What should be the immediate next step in her management?

1. Check peak expiratory flow rate
2. Check chest x-ray, PA view

3. Check serum TSH level
4. Check serum electrolyte panel ✔
5. Obtain electromyography (EMG)

INCORRECT ✖

The correct answer is 4.

While this patient received appropriate treatment for her asthma attack, her muscle weakness is a medication side effect β2-agonists like albuterol reduce serum potassium levels by driving potassium into cells. In some patients, clinically significant hypokalemia can result, causing muscle weakness, arrhythmias, and EKG changes. Other common side effects of β2 agonists include tremor, headache and palpitations. Obtaining a serum electrolyte panel would be helpful here to confirm and assess the severity of this patient's hypokalemia.

(Choice 1) The peak expiratory flow rate is an important objective measure for evaluating the severity of an asthma attack and monitoring for respiratory improvement However, this patient's respiratory symptoms have subsided.

(Choice 2) Chest x-ray in an acute asthma exacerbation may reveal lung hyperinflation, but generally will not affect management Chest x-rays are most useful where foreign body aspiration or underlying pneumonia
are suspected.

(Choice 3) Weakness may be a presenting symptom of hyper- or hypothyroidism. Such patients are also likely to present with cold intolerance and weight gain (hypothyroidism) or heat intolerance and weight loss (hyperthyroidism). This patient's acute presentation and history, however, should raise greater concern for hypokalemia.

(Choice 5) EMG measures the electrical activity of muscle fibers and is useful in the evaluation of muscle weakness due to neuropathic or myopathic conditions. This patient's muscle weakness is most likely due to hypokalemia, and therefore an electrolyte panel is a more appropriate first step in her evaluation.

12. Question **1 points**

A 26-year-old white female comes to the Emergency Room with severe shortness of breath. She has a long history of asthma with periodic exacerbations. She is taking an inhaled albuterol, inhaled steroid, salmeterol and cromolyn. Her temperature is 37.2C (99F), blood pressure is 150/90 mmHg, pulse is 110/min, and respirations are 24/min. On examination, she has moderate respiratory distress, prolonged expiratory phase, and significant wheezing all over the lung fields. Patient is admitted and is given nebulized albuterol, intravenous methyl prednisone, and oxygen. The next day her respiratory status improved. Her vital signs did not change much, except normalization of respiratory rate. Still scattered bilateral wheezes are heard on lung auscultation. The next day her laboratory values are:

Hemoglobin: 14 g/dL
MCV: 95fL
Leukocyte count: 19,000/cm^2
Segmented Neutrophils: 80%
Bands: 5%
Lymphocytes: 13%
Eosinophils: 0%
Basophils: 0%
Monocytes: 2%

Chest x-ray obtained at the time of admission is normal, except for hyperinflated lung fields. What is the most probable cause of the abnormal lab findings in this patient?

1. Pneumonia
2. Hypersensitivity reaction
3. Myeloproliferative state
4. Metabolic disorder
5. Drug reaction ✔

INCORRECT ✖
The correct answer is 5.
The most probable cause of leukocytosis in this patient is glucocorticoid-induced neutrophilia. Glucocorticoids have a complex effect on the blood cells. They tend to diminish the number of circulating eosinophils and have distinct lymphopenic effect. They also increase the neutrophil count by increasing the bone marrow release and mobilizing the marginated neutrophil pool. It is not uncommon to see neutrophilia during treatment with glucocorticoids.
(Choice 1) is unlikely in this case, because no other symptoms and signs are present (cough, fever, chest x-ray findings).
(Choice 2) is a potential cause of leukocytosis due to hypersensitivity-induced inflammation, but the leukocyte differential (pure neutrophilia without eosinophilia) is not typical for this type of reaction.
(Choice 3) is unlikely in this case. The patient had received high doses of IV steroids, and it almost always causes left shift.
(Choice 4) No obvious metabolic disorder, (e.g., ketoacidosis or poisoning), can be responsible for the leukocytosis that is present.

13. Question **1 points**

A 40-year-old black male presents with dyspnea and tachypnea of sudden onset. He says that he was diagnosed with deep venous thrombosis (DVT) of the lower extremities three times before. Ventilation/perfusion scan reveals mismatched perfusion defect. Venous ultrasonography is positive for DVT. You suspect that inherited predisposition to hyper coagulation may be present. Which of the following is the most common form of such a predisposition?

1. Protein C deficiency
2. Protein S deficiency
3. Antithrombin III deficiency
4. Factor V Leiden ✔
5. Plasminogen disorders

INCORRECT ✖

The correct answer is 4.

This patient presents with pulmonary thromboembolism and has a history of recurrent 'unexplained' DVT of the lower extremities. Factor V Leiden is recently recognized as a relatively common cause of such a condition. Factor V Leiden is the result of a point mutation in a gene coding for the coagulation factor V. As a result of this mutation, Factor V becomes resistant to inactivation by protein C, an important counterbalance factor in hemostatic cascade. The prevalence of factor V Leiden may be as high as 5-6% of the population. **(Choices 1, 2, 4 & 5)** Other disorders causing inherited predisposition to thrombosis-like protein C deficiency, protein S deficiency, antithrombin III deficiency, and plasminogen disorders are quite rare.

14. Question

1 points

A 32-year-old male presents to your office complaining of daytime sleepiness and frequent nighttime awakenings. He says that his sleep gets disrupted by a choking sensation, sometimes accompanied by cough and dyspnea. After such episodes he typically has trouble falling back to sleep. The patient notes that his symptoms are somewhat improved when he sleeps with multiple pillows. Physical examination is unremarkable except for a BMI of 29 kg/m^2. What is the most likely diagnosis?

1. Restless leg syndrome
2. Asthma
3. Left ventricular failure

4. Obstructive sleep apnea

5. Central sleep apnea

6. Gastroesophageal reflux disease ✔

INCORRECT ✖

The correct answer is 6.

The differential diagnosis of repeated nocturnal awakenings associated with dyspnea and cough includes asthma, congestive heart failure and gastroesophageal reflux disease (GERO). Daytime sleepiness may result from any condition causing sleep interruption. Overnight asthma attacks **(Choice 2)** would not be improved by head elevation, nor would repeated overnight asthma exacerbations (a sign of advanced disease) occur in a patient without daytime symptoms, wheezes on exam, or a history of asthma. Heart failure **(Choice 3)** can cause paroxysmal nocturnal dyspnea, cardiac asthma and simple orthopnea, which may all disturb sleep and improve with head elevation, but a patient with this degree of heart failure would likely have consistent signs on physical examination (e.g. peripheral edema, bibasilar rales, decreased exercise tolerance). The description in the vignette favors a diagnosis of GERO. Reflux of gastric contents into the pharynx gives the classic unpleasant sour taste of "heartburn," and reflux into the larynx and tracheobronchial tree can cause cough, bronchial constriction, laryngitis, hoarseness, laryngospasm and possibly aspiration pneumonia. Chronic GERO may be complicated by laryngotracheal stenosis, pulmonary fibrosis and Barrett's esophagus.

(Choice 1) Restless leg syndrome is characterized by abnormal creeping or crawling sensations in the lower extremities that are exacerbated by inactivity and relieved by motion. Difficulty falling asleep and nocturnal awakenings may occur.

(Choice 4) Obstructive sleep apnea is characterized by loud snoring with occasional apneic episodes, typically in an obese patient. These episodes are usually witnessed by the patient's spouse and are not typically remembered by the patient. A choking sensation and cough are not classically present.

(Choice 5) Central sleep apnea causes nocturnal awakenings with apnea due to a failure of central respiratory drive. A choking sensation and cough are not typically present. This condition is often secondary to stroke.

15. Question

1 points

A 60-year-old man comes to the physician because of worsening fatigue and nausea. He had a carotid angiogram for the evaluation of symptomatic carotid artery stenosis 15 days ago, and was discharged home three days after the procedure. His medical problems are hypercholesterolemia, coronary artery disease, intermittent claudication, hypertension for 18 years, and diabetes mellitus for 15 years. Physical examination shows painless, reddish-blue mottling of the skin of the extremities. Laboratory studies show:

Hb: 10.5 g/dl
WBC: 10,000/cm^2 with 12% eosinophils
BUN: 46 mg/dl
Serum creatinine: 3.0 mg/dl
Serum C 3 level: Decreased

Urinalysis:
pH: Normal
Esterase: Negative
Nitrite: Negative
Protein: 1+
WBC: Many eosinophils
RBC: 1-2/HPF

Which of the following is the most likely cause of this patient's findings?

1. Contrast nephropathy
2. Cholesterol embolism ✔
3. Diabetic nephropathy
4. Post streptococcal glomerulonephritis
5. Acute allergic interstitial nephropathy

INCORRECT ✖

The correct answer is 2.

Atheroembolic disease (AED), also known as cholesterol embolization, occurs due to showering of cholesterol crystals from the aorta or other major arteries. It usually manifests following surgical or interventional manipulation of the arterial tree, or during/following treatment with anticoagulants or and hypocomplementemia. The definitive diagnosis is made by tissue biopsy, which shows cholesterol crystals. Treatment is conservative. Anticoagulation should be stopped since it may prevent healing of the ruptured plaques. Steroids have been used with little success.

(Choice 1) Contrast-induced nephropathy (contrast is used for the angiogram) is usually seen within 24-72 hours of the procedure. It is very unlikely to occur five days after the procedure. Patients usually improve over a period of time, and do not present with skin findings. The recommendations for the prevention of contrast nephropathy are:

1. Periprocedural hydration
2. Use of a low-osmolality contrast
3. Limiting the amount of contrast agent.

Patients with borderline renal failure will also benefit from prophylactic administration of N-acetylcysteine (Mucomyst) and fenoldopam.

(Choice 3) Diabetic nephropathy is characterized by heavy proteinuria, and is not associated with eosinophiluria and eosinophilia (which were seen in this patient). Furthermore, OM nephropathy develops
over a period of years, not months. Hence, if a diabetic patient presents with a rapid decline (over months) in renal function, look for other causes of renal failure.
(Choice 4) Post-streptococcal glomerulonephritis is characterized by a nephritic picture in a patient with a history of streptococcal throat or skin infections. Complement levels are low. Skin manifestations such as live do reticularis or eosinophilia are not seen.
(Choice 5) Acute allergic interstitial nephropathy is a drug-induced hypersensitivity reaction characterized by rash, renal failure, eosinophilia, and eosinophiluria (Hansel stain). The common medications that you should remember for the exam are:

1. Antibiotics (most common is methicillin group)
2. NSAIDs (often cause heavy proteinuria)
3. Thiazides
4. Phenytoin
5. Allopurinol

16. Question

1 points

A 50-year-old man comes to the emergency department due to a sudden onset of severe, colicky pain in the right flank. He was admitted twice in the past for similar complaints; he was managed conservatively and sent home on both occasions. He has no other medical problems. He does not use tobacco, alcohol or drugs. His vital signs are stable. He is given IV fluids and narcotics. Laboratory studies show:

Hb 14.5 g/dl
WBC 13,000/cm^2; no bands
Platelets 300,000/cm^2
BUN 16 mg/dl
Serum Creatinine 0.8 mg/dl

CT scan of the abdomen without contrast shows renal calculi. Which of the following is the best advice for the prevention of future stones in this patient?

1. Decrease dietary calcium intake
2. Mega doses of Vitamin C
3. Decrease dietary protein and oxalate ✔
4. Restrict fluid intake
5. Increase sodium intake

INCORRECT ✖

The correct answer is 3.

Renal calculi typically present as colicky abdominal pain. The most common renal stones are calcium stones. CT scan of the abdomen without contrast is the diagnostic procedure of choice because it can detect radiopaque (e.g., calcium) as well as radiolucent (e.g., uric acid) stones. (KUB or abdominal radiograph is not the best test) A high protein diet is associated with an increased predisposition to stone formation, mainly calcium stones; hence, patients with an established diagnosis of nephrolithiasis should be advised to restrict protein in their diet.

(Choice 1) Although hypercalciuria is commonly present in patients with stone disease, dietary calcium restriction is no longer recommended in patients with renal calculi. Limiting calcium intake actually has a paradoxical effect, and has been associated with an enhanced tendency towards stone formation. For these reasons, patients are now encouraged to include calcium in their diet.

(Choice 2) Mega doses of Vitamin C lead to increased formation of oxalate stones, especially in patients with renal failure.

(Choice 4) Restricted fluid intake actually precipitates stone formation. The resultant decreased urine output increases urinary oxalate and calcium concentration. Adequate hydration is thus recommended, and patients are typically advised to drink at least 2 liters of fluid per day.

(Choice 5) Increased sodium intake enhances calcium excretion. Furthermore, sodium and water reabsorption is followed by passive reabsorption of calcium in the proximal tubule. Since hypercalciuria is a common finding in patients with renal calculi, such patients should be advised to restrict sodium intake. Patients with hypercalciuria and recurrent stones should be placed on hydrochlorothiazide to prevent recurrent stone formation. If a patient on adequate HCTZ develops recurrent calcium stones, his urine sodium level should be checked to make sure that he is compliant with the sodium-restricted diet.

17. Question

1 points

A 45-year-old man comes to the emergency department (ED) with severe right flank pain. He is tossing in bed due to the pain. KUB done in the ED shows no abnormalities; however, abdominal ultrasound shows a 5 mm stone in the right ureter. Urinalysis shows:

Urine pH: 4.5 (normal is 5-6)
WBC: Absent
RSC: 2-3/HPF
Bacteria: Absent
Nitrites: Negative
Esterase: Negative

Which of the following is the most beneficial next step in management?

1. Oral sodium bicarbonate ✔
2. Hydrochlorothiazide
3. Furosemide
4. High-protein diet
5. Calcium-restricted diet

INCORRECT ✖

The correct answer is 1.

Consider three possibilities when a flat film of the abdomen and pelvis does not show a stone in a patient with typical renal colic:\

1. 1 . Radiolucent stone disease (uric acid stones)
2. Calcium stones less than 1 to 3 mm in diameter
3. Non-stone causes (e.g., obstruction by a blood clot or tumor)

In this case, the patient most likely has uric acid stones. Uric acid stones account for approximately 10-15% of cases of total nephrolithiasis. These are most commonly seen in patients with unusually low urine pH levels (which may be due to a defect in renal ammonia secretion) and hyperuricosuria. These are radiolucent, but can be seen on USG and CT scan (as in this patient). Treatment includes hydration, alkalinization of urine, and a low-purine diet with/without allopurinol, depending on the presence of hyperuricosuria. Since uric acid stones are highly soluble in alkaline urine, alkalinization of urine to pH > 6 .5 with oral sodium bicarbonate or sodium citrate is indicated.

(Choice 2) Hydrochlorothiazide decreases urinary calcium excretion, and is used in the management of recurrent hypercalciuric renal stones.

(Choice 3) Furosemide is associated with hypercalciuria, and can thus predispose a patient to calcium stone formation.

(Choice 4) A purine-restricted diet (not high-protein diet) is indicated in patients with uric acid stones secondary to hyperuricosuria.

(Choice 5) A calcium-restricted diet is not beneficial in the management of uric acid stones. It is not advised even in patients with calcium stones, as calcium restriction can cause potential negative calcium balance and hyperoxaluria due to the consequent increased GI absorption of oxalate.

18. Question

1 points

A 57-year-old man comes to the physician because of 2 episodes of hematuria. He also complains of cough fatigue and fever for several days. He has smoked two packs of cigarettes daily for 25 years. He does not use alcohol or drugs. Vital signs are stable. Examination shows a left-sided

varicocele which fails to empty when the patient is recumbent; examination otherwise shows no abnormalities. Laboratory studies show Hb of 16.2 g/dl and platelets of 480,000/cm^2. Which of the following is the most appropriate diagnostic step in management?

1. Chest x-ray
2. Abdominal CT scan ✔
3. Urinalysis
4. Serum alfa-fetoprotein levels
5. Ultrasonogram of the testicles

INCORRECT ✖

The correct answer is 2.

This patient most likely has renal cell carcinoma (RCC). Most of the patients with RCC are asymptomatic until the disease is advanced. The classic triad of RCC (flank pain, hematuria, and a palpable abdominal renal mass) is uncommon (1 0% of patients); when present, it strongly suggests advanced/metastatic disease. Hematuria is seen only in about 40% of patients. Scrotal varicocele, (the majority are on left-side), may be observed in a few patients (< 10%). Varicoceles typically fail to empty when the patient is recumbent. Presence of this finding should always raise suspicion for a renal cell carcinoma, which is most commonly due to obstruction of the gonadal vein where it enters the renal vein. 20% of patients may also have constitutional symptoms like fever, night sweats, anorexia, weight loss, or an easy fatigability. Increased erythropoietin by kidney mass can produce polycythemia and thrombocytosis.

(Choice 2) CT scan of the abdomen is most sensitive and specific for diagnosing the renal cell carcinoma and should be obtained when the index of suspicion is high.

(Choice 1) Chest x-ray is an important investigation to look for metastasis but is not going to reveal the diagnosis in this patient.

(Choice 3) Urinalysis may detect hematuria but it is nonspecific and only 40% of patients with renal cell carcinoma have hematuria.

(Choices 4 & 5) These findings are unlikely with testicular carcinoma; therefore, an USG of the testicles or serum alpha fetoprotein are not required in this patient.

19. Question **1 points**

A 64-year-old male with a past medical history of hypertension, diabetes and chronic renal insufficiency presents with gross hematuria. His baseline serum creatinine is 1.6-1.7 mg/dl. The patient's medications include aspirin, hydrochlorothiazide, enalapril, and simvastatin. He has no known environmental, medication, or contrast allergies. On physical examination, the patient has a

blood pressure of 130/80 mm Hg. The examination is otherwise unremarkable. Contrast CT scan of the abdomen is planned to evaluate his condition. Which of the following interventions would be most helpful in preventing contrast-induced kidney damage?

1. Prednisone
2. Non-ionic contrast agent ✔
3. Furosemide
4. 100% oxygen mask
5. Stopping simvastatin

INCORRECT ✖

The correct answer is 2.

Before ordering a CT scan with contrast, the physician should always consider the patient's renal function. Patients with a history of renal insufficiency (Cr> 1 .5) and/or diabetes are at heightened risk for contrast-induced nephropathy. In these cases, alternative studies (e.g. ultrasound) should be considered. If CT with contrast is necessary, certain precautions can be taken to minimize the risk of contrast nephropathy. Non-ionic contrast agents have been shown to decrease the incidence of contrast-induced nephropathy compared to the older ionic hyperosmolar agents. The patient described above is at especially high risk as he has both diabetes and an elevated baseline creatinine, thus, non-ionic contrast agents should be used.

(Choice 1) Prednisone can be used to prevent hypersensitivity reactions to contrast media in patients with known dye allergies. Dye allergies cause reactions like flushing, urticaria, angioedema, bronchospasm, etc. when contrast is administered. Prednisone does not prevent contrast-induced nephropathy, and in patients with renal insufficiency, prednisone can actually cause fluid retention. Prednisone can also cause elevations in blood pressure.

(Choice 3) Diuretics do not prevent contrast-induced nephropathy. Furosemide may actually slightly increase the risk of contrast nephropathy.

(Choice 4) Administration of 100% oxygen does not prevent contrast-induced nephropathy. Furthermore, administration of high concentrations of supplemental oxygen when it is not indicated can lead to negative consequences.

(Choice 5) Though not currently recommended for routine administration prior to contrast administration, statins are known to improve endothelial function and reduce oxidative stress and may therefore have some benefit in preventing contrast nephropathy. NSAIDs, on the other hand, should be withheld before the procedure, as they can cause renal vasoconstriction.

20. Question **1 points**

A patient with benign prostatic hyperplasia has moderately severe symptoms and is started on finasteride. After six months of treatment with finasteride, his symptoms improve remarkably and his prostate has regressed in size. Which of the following histological patterns was most likely present at the time of initiation of treatment?

1. Hyperplasia of prostate with predominance of epithelial components ✔
2. Hyperplasia of prostate with predominance of muscular element
3. Hyperplasia of prostate with predominance of collagen
4. Hyperplasia of prostate with predominance of both collagen and smooth muscles

INCORRECT ✖

The correct answer is 1.

Medical treatment of benign prostatic hyperplasia is either with finasteride or α-1 blockers. Finasteride is a 5-α reductase inhibitor and it inhibits the conversion of testosterone to dihydrotestosterone. It acts on the epithelial components of the prostate gland and produces improvement of symptoms as well as reduction in the size of the gland. There are various histological patterns of BPH. Some patients have predominant epithelial hyperplasia and others have predominant stromal hyperplasia. Those with stromal hyperplasia may have collagen or smooth muscle predominance. Patients with epithelial predominance best respond to treatment with finasteride.

α-1 blockers produce symptomatic improvement in patients with BPH by their action on smooth muscles present in prostate and bladder base. Patients with smooth muscle predominance best respond to treatment with α-1 blockers. Patients with collagen predominance respond neither to finasteride nor to α-1 blockers.

21. Question

1 points

A 60-year-old man comes to the physician's office because of fatigue and hematuria. His past medical history is significant for fatty liver, gout, and anemia. He has smoked two packs of cigarettes daily for 40 years. He is a heavy alcohol drinker. His last visit to his physician was 1 month ago for the 'flu'. His temperature is 37.1C (98.9F), blood pressure is 145/90mm Hg, pulse is 78/min, and respirations are 14/min. Examination shows no abnormalities. Dipstick testing is positive for hematuria. Laboratory studies show:

Urinalysis

Glucose: Negative
Ketones: Negative
Leukocyte esterase: Negative

Nitrites: Negative
WBC: 1-2/hpf
RBC: 1-2/hpf
Casts: Epithelial cell

Serum chemistry

Serum Na: 140 mEq/L
Serum K: 5.0 mEq/L
Bicarbonate: 20 mEq/L
BUN: 36 mg/dL
Serum creatinine: 34 mg/dL

Which of the following is the most likely diagnosis?

1. Post infectious glomerulonephritis
2. Hepatorenal syndrome
3. Rhabdomyolysis ✔
4. Renal cell cancer
5. Bladder cancer

INCORRECT ✖
The correct answer is 3.
The most likely diagnosis is rhabdomyolysis, which is characterized by the breakdown of muscles. Its most common cause is alcoholism. Its risk factors include crush injuries to the muscles, strenuous exercise, seizures and metabolic derangements. Dipstick testing reveals hematuria, but microscopic analysis of urine does not reveal RBCs. Serum creatinine levels are disproportionately elevated as compared with BUN levels. Acute tubular necrosis (ATN) can occur in the setting of rhabdomyolysis due to ischemia or toxins, which may be endogenous or exogenous. Hemoglobin or myoglobins are endogenous nephrotoxic substances which can accumulate in the kidney due to the breakdown of muscles, thereby leading to ATN. Serum CK levels should be measured in suspected patients. The treatment includes aggressive intravenous hydration and alkalinization of urine. In some cases, forced diuresis with mannitol may be required.
(Choice 1) Post-infectious glomerulonephritis presents with a picture of nephritic syndrome. Urinalysis shows active urinary sediment with red blood cell clumps and red blood cell casts. Hypertension and oliguria may be observed.
(Choice 2) Hepatorenal syndrome occurs in patients with advanced liver failure and azotemia.
(Choice 4) Renal cell cancer presents with the triad of dull flank pain, hematuria and fever. Both dipstick testing and microscopic examination reveal hematuria. This is a good differential diagnosis for this patient; however, the characteristic findings and history of a

prior flu-like illness make the diagnosis of rhabdomyolysis more likely.
(Choice 5) Bladder cancer presents with painless hematuria. Both dipstick testing and microscopic examination reveal hematuria.

22. Question

1 points

A 50-year-old man comes to the physician because of a skin rash, joint pains, malaise and fatigue. He has a history of intravenous drug abuse. His temperature is 37.1 C (98.9F), blood pressure is 140/90 mm Hg, pulse is 80/min, and respirations are 14/min. Examination shows palpable purpura and hepatosplenomegaly. Urinalysis shows hematuria, red blood cell casts and proteinuria. The results of the laboratory studies are as follows:

BUN: 30 mg/dl
Creatinine: 2.0 mg/dl
Serum complement: Low
Anti-HCV: Positive

Which of the following is the most likely diagnosis?

1. Henoch-Schonlein purpura
2. Mixed essential cryoglobulinemia ✔
3. Systemic lupus erythematosus
4. Microscopic polyangiitis
5. Benign recurrent hematuria

INCORRECT ✖
The correct answer is 2.
Suspect mixed cryoglobulinemia in a patient who presents with palpable purpura, proteinuria and hematuria. Other suggestive clinical manifestations include nonspecific systemic symptoms, arthralgias, hepatosplenomegaly and hypocomplementemia. The demonstration of circulating cryoglobulins is confirmatory. Majority of patients have an underlying HCV infection. For this reason, all such patients should be tested for HCV antibodies.
(Choice 1) Henoch-Schonlein purpura usually presents in childhood as palpable purpura on the buttocks, abdominal pain, arthralgias, proteinuria and hematuria with RBC casts on urinalysis. Serum complement levels are normal. HCV infection is not associated with this disease.
(Choice 3) SLE usually occurs in young adult females. Skin manifestations include malar or discoid rash. Serology is positive for anti-nuclear antibodies; anti-DNA and Anti-Sm antibodies are very specific for SLE. Renal involvement is quite common.

(Choice 4) Microscopic polyangiitis usually presents with constitutional symptoms of fever and malaise. Other features may include abdominal pain and hematuria with active urinary sediment and purpura. Serology is usually negative, except for ANCAs; serum complement levels are normal.

23. Question

1 points

A 40-year-old man comes to the physician because of a two-week history of fatigue, lower extremity edema and dark urine. He has no history of serious illnesses. He takes no medications. He does not use tobacco, alcohol, or drugs. His blood pressure is 130/80 mm Hg and pulse is 80/min. Physical examination shows symmetric pitting edema of lower extremities. Laboratory studies show a serum creatinine level of 1.1 mg/dl. Urinalysis shows 4+ proteinuria and microhematuria. Light microscopy of the specimen obtained from kidney biopsy shows dense deposits within glomerular basement membrane that stain for C3, not immunoglobulins. Which of the following is the most likely pathophysiologic mechanism that explains this patient's condition?

1. Anti-GBM antibodies
2. Circulating immune complexes
3. Persistent activation of the alternative complement pathway ✔
4. Cell-mediated injury
5. Non-immunologic damage

INCORRECT ✖

The correct answer is 3.

This patient with nephrotic-range proteinuria and hematuria most likely has membranoproliferative glomerulonephritis. Dense intramembranous deposits that stain for C3 is a characteristic microscopic finding for membranoproliferative glomerulonephritis, type 2 (also called dense deposit disease). This condition is unique among glomerulopathies, because it is caused by IgG antibodies (termed C3 nephritic factor) directed against C3 convertase of the alternative complement pathway. These antibodies reacting with C3 convertase lead to persistent complement activation and kidney damage.

(Choice 1) Anti-GBM antibodies are characteristic for Goodpasture's syndrome.

(Choice 2) Circulating immune complexes account for the group of glomerulonephritis called immune complex-mediated glomerulopathies that include SLE, post-streptococcal glomerulonephritis, etc.

(Choice 4) Cell-mediated injury may be important in idiopathic crescentic glomerulonephritis.

(Choice 5) Non-immunologic kidney damage is believed to operate in diabetic nephropathy, hypertensive nephropathy, etc.

24. Question

1 points

A 35-year-old man comes to the physician due to a one-month history of weight gain and facial edema. The facial edema resolves at the end of the day, but ankle edema develops. His temperature is 37.2 C (99 F), blood pressure is 142/80 mm Hg, pulse is 80/min, and respirations are 16/min. Examination shows 2+ ankle edema. Laboratory studies show:

Hb: 11.0 g/dl
WBC: 8,000/cm^2
Platelets: 200,000/cm^2
Serum Na: 135 mEq/L
Serum albumin: 2.2 g/dl
BUN: 16 mg/dl
Serum creatinine: 1.0 mg/dl

Urinalysis:

Glucose: Absent
Protein: 4+
WBC: 1-2/HPF
RBC: Absent
Casts: Fatty casts

This patient is most likely at risk for developing which of the following?

1. Rupture of brain aneurysm
2. Abdominal aortic aneurysm
3. Hypercoagulability ✔
4. Pulmonary hemorrhage
5. Gall stone pancreatitis

INCORRECT ✖

The correct answer is 3.

The patient in this clinical vignette has nephrotic syndrome. Nephrotic syndrome is a clinical complex characterized by:

1. Proteinuria (> 3-3.5 g/day- most important manifestation)
2. Hypoalbuminemia
3. Edema
4. Hyperlipidemia and lipiduria

The basic pathology is altered permeability of the glomerular membrane for proteins. Diseases most commonly causing nephrotic syndrome are minimal change disease (in children), membranous glomerulopathy (adults), mesangial proliferative glomerulonephritis, membranoproliferative glomerulonephritis, and focal segmental glomerulosclerosis.
Nephrotic syndrome is frequently complicated by hyper coagulation, with a consequent risk of thromboembolic complications. The etiology of hyper coagulation in nephrotic syndrome is multifactorial and includes: increased urinary loss of antithrombin 3, altered levels of protein C and S, increased platelet aggregation, hyperfibrinogenemia due to increased hepatic synthesis, and impaired fibrinolysis. Renal vein thrombosis is the most common manifestation of coagulopathy (especially with membranous glomerulopathy), but arterial thrombosis and pulmonary embolism may also occur. Coagulopathy is less common but more severe in children as compared to adults with nephrotic syndrome.
Complications of nephrotic syndrome include: protein malnutrition, iron-resistant microcytic hypochromic anemia due to transferrin loss, vitamin 0 deficiency due to increased urinary excretion of cholecalciferol binding protein, decreased thyroxin levels due to loss of thyroxine-binding globulin, and increased susceptibility to infection.
(Choices 1 & 2) Rupture of a brain aneurysm and abdominal aortic aneurysms are more likely to be seen in patients with adult polycystic kidney disease. Such patients do not present with nephrotic syndrome.
(Choice 4) Pulmonary hemorrhage is a manifestation of Goodpasture's disease or Wegener's granulomatosis. These cause nephritic (not nephrotic) syndrome.
(Choice 5) Gallstone pancreatitis is not a complication of nephrotic syndrome.

25. Question

1 points

A 65-year-old woman comes to the physician because of a two-month history of fatigue and weight gain. She has rheumatoid arthritis and hypertension. She takes hydrochlorothiazide and naproxen. She does not use tobacco, alcohol, or drugs. Her blood pressure is 120/70 mm Hg, pulse is 80/min, and respirations are 14/min. Physical examination shows generalized edema; liver is palpated 2 cm below the costal margin. Urinalysis shows 4+ proteinuria. Ultrasound of the kidneys shows slight enlargement. Renal biopsy was performed. Which of the following is the most likely finding on renal specimen analysis?

1. Crescent formation on light microscopy
2. Deposits revealed under polarized light ✔
3. Linear immunoglobulin deposits revealed on immunofluorescence microscopy
4. Granular immunoglobulin deposits revealed on immunofluorescence microscopy
5. Normal light microscopy findings

INCORRECT ✖

The correct answer is 2.

Amyloidosis is the most probable cause of nephrotic syndrome in this patient. The clues to the correct diagnosis include history of rheumatoid arthritis (that predisposes to amyloidosis), enlarged kidneys, and hepatomegaly. The typical findings on renal biopsy in such a patient are amyloid deposits that show app/e green birefringence under polarized light after staining with Congo red. Extracellular amyloid fibrils demonstrated on electron microscopy are also typical.

(Choice 1) Crescent formation revealed on light microscopy is characteristic for rapidly progressive glomerulonephritis (RPGN).

(Choices 3 & 4) Linear immunoglobulin deposits on immunofluorescence microscopy are typical for anti glomerular basement membrane disease (e.g., Goodpasture's syndrome) and granular deposits are usually present during immune complex glomerulonephritis (e.g., lupus nephritis or poststreptococcal glomerulonephritis).

(Choice 5) Normal light microscopy findings in a patient with nephrotic syndrome usually suggest minimal change disease.

26. Question

1 points

A 73-year-old man comes to the physician because of a one-year history of progressively worsening urinary urgency, hesitancy, nocturia, and weak urinary stream. He has no fever, abdominal pain, hematuria, malaise or weight loss. He takes atenolol for essential hypertension. He has no history of diabetes mellitus or ischemic heart disease. He does not use tobacco, alcohol, or drugs. Rectal examination shows a smooth, firm enlargement of the prostate with no induration or asymmetry. Neurological examination shows no abnormalities. Urinalysis shows no abnormalities. Laboratory studies show serum creatinine of 2.1 mg/dl. Which of the following is the most appropriate next step in management?

1. Ultrasound of kidneys, ureters. and bladder ✔
2. Watchful waiting
3. Transurethral resection of prostate
4. Treatment with finasteride
5. Treatment with prazosin

INCORRECT ✖

The correct answer is 1.

The above patient is most likely suffering from benign prostatic hyperplasia. All patients with irritative or obstructive voiding symptoms should have their urinalysis and serum creatinine

done; as such symptoms are not always due to benign prostatic hyperplasia. Such symptoms may be produced by multiple causes like benign prostatic hyperplasia, bladder cancer, prostate cancer, urethral stricture, neurogenic bladder and urinary tract infections. Urinalysis helps to rule out urinary tract infection and serum creatinine detects renal insufficiency that might be due to bladder outlet obstruction. Patients with elevated serum creatinine levels should have ultrasound of the kidney, ureter and bladder done. Therefore in the above patient, the most appropriate next step is ultrasound.

(Choice 2) Management of benign prostatic hyperplasia depends upon the severity of symptoms and the presence or absence of complications or other concomitant conditions. Patients with mild symptoms are treated with watchful waiting.

(Choices 4 & 5) Patients with moderate symptoms are given medical treatment with finasteride or α-adrenergic blockers like terazosin.

(Choice 3) Patients with severe symptoms are candidates for surgical treatment for which Transurethral Resection of Prostate (TURP) is the standard of care. Patients with recurrent urinary tract infection, recurrent gross hematuria, bladder stones, renal insufficiency or refractory urinary retention are also candidates for invasive treatment.

27. Question

1 points

A 26-year-old man comes to the emergency department because of a sudden onset of severe right-sided flank pain. The pain is colicky and radiates from the flank to the scrotum. He also has nausea, vomiting and dark-colored urine. He has never had these symptoms before. His temperature is 37C (98.6F), blood pressure is 126/70 mm Hg, pulse is 90/min, and respirations are 18/min. Examination shows no abnormalities. He is given adequate analgesia. Non-contrast helical CT shows a 4 mm radiopaque stone in the right upper ureter. Laboratory studies show serum calcium of 9.8 mg/dl, serum creatinine of 0.9 mg/dl, and BUN of 15 mg/dl. Urinalysis shows hematuria but no casts. Which of the following is the most appropriate next step in management?

1. 24 hr urine collection for metabolic evaluation
2. Reassurance
3. Fluid intake greater than 2 L/day ✔
4. Intake of potassium citrate
5. Restriction of dietary oxalate

INCORRECT ✖

The correct answer is 3.

This patient has the classic clinical presentation of nephrolithiasis. The following are important concepts in the management of such patients.

1. Imaging study – CT scan of the abdomen without contrast is the investigation of choice because of its high sensitivity and specificity. It has the advantage over the plain abdominal x-ray (KUB) in detecting the radiolucent stones.
2. Narcotics and NSAIDs – These are equally effective in relieving the pain of acute renal colic; however, in patients with normal renal function, NSAIDs are preferred over narcotics because the latter can exacerbate nausea and vomiting.
3. Size of the stone – Stones measuring less than 5mm in diameter typically pass spontaneously with conservative management. This includes a fluid intake of greater than 2L daily. Increased hydration increases the urinary flow rate and lowers the urinary solute concentration, thus preventing stone formation.
4. Urology referral – Urgent urologic evaluation is warranted in patients with anuria, urosepsis, or acute renal failure.

(Choice 1) A detailed metabolic evaluation is not needed when a patient presents with his first renal stone. In patients with recurrent renal stones, 24-hr urine is collected to identify any underlying metabolic disorder. A complete urinary evaluation includes measurement of calcium, citrate, creatinine, uric acid, oxalate, pH and sodium levels.
(Choice 2) Reassurance alone is not appropriate. Although his renal stone is relatively small, he still requires conservative management (i.e., adequate hydration).
(Choice 4) Potassium citrate is the appropriate treatment when a patient presents with a history of recurrent stone formation due to citrate deficiency.
(Choice 5) Restriction of dietary oxalate is helpful when a patient presents with a history of recurrent calcium stone formation due to hyperoxaluria.

28. Question

1 points

A 27-year-old man comes to the physician because of a 2-day history of periorbital swelling. He was treated with oral dicloxacillin for a skin infection 3-weeks ago. His urine has turned darker. His temperature is 37.4C (99.4F), blood pressure is 150/90 mm Hg, pulse is 80/min, and respirations are 15/min. Examination shows periorbital swelling. Urinalysis shows 8 RBCs/HPF with RBC casts and a mild proteinuria. Laboratory studies show low serum C3 levels; BUN is 40 mg/dl and serum creatinine is 2 mg/dl. Which of the following is the most likely diagnosis?

1. Drug-induced acute interstitial nephritis
2. Acute pyelonephritis
3. Post streptococcal glomerulonephritis ✔
4. Membranoproliferative glomerulonephritis
5. IgA nephropathy

INCORRECT ✖

The correct answer is 3.

Post-streptococcal glomerulonephritis is seen 10-20 days after streptococcal throat or skin infections. Presenting features may include periorbital swelling, hematuria and oliguria. The patient may be hypertensive and urinalysis shows hematuria with RSC casts and proteinuria. Serum C3 complement levels are low.

(Choice 1) Drug-induced interstitial nephritis occurs with many drugs like penicillins, cephalosporins and sulfonamides. Clinical features include fever, rash and arthralgia. Other features are peripheral eosinophilia, hematuria, sterile pyuria and eosinophiluria. WBC casts may be present in the urine, but red cell casts are rare.

(Choice 2) Patients with acute pyelonephritis may present with high fevers, rigors and flank pain. In addition their urinalysis shows pyuria and bacteriuria.

(Choice 5) Patients with IgA nephropathy typically present with hematuria after an upper respiratory tract infection and a latent period between infection and the actual onset of the disease. Development of features of glomerular disease is less than 5 days. Serum complement levels are normal in such cases.

(Choice 4) Membranoproliferative glomerulonephritis is not the likely diagnosis in this case.

29. Question

1 points

A 27-year-old man comes into the emergency department because of a 2-week history of hemoptysis, breathing difficulty, ankle edema, and dark urine. His past medical history is insignificant. He is not taking any medication. He does not use tobacco, alcohol, or drugs. Laboratory studies show:

Hb: 10.5 g/dl
Serum Na: 135 mEq/L
Serum K: 4 .8 mEq/L
BUN: 36 mg/dl
Serum creatinine: 2 .8 mg/dl

Urinalysis shows numerous dysmorphic red blood cells/HPF, moderate proteinuria, and red cell casts. Chest x-ray reveals bilateral alveolar infiltrates. Diagnosis of which of the following pulmonary-renal syndromes require emergency plasmapheresis?

1. Goodpasture's syndrome ✔
2. Wegener's granulomatosis
3. SLE-associated nephritis
4. Polyarteritis nodosa
5. Idiopathic rapidly progressive glomerulonephritis (RPGN)

INCORRECT ✖

The correct answer is 1.

Pulmonary-renal syndromes are caused by a variety of disorders, and are characterized by simultaneous involvement of the lungs and kidneys. Quick and thoughtful differential diagnosis should be performed because the management differs per disease.

Goodpasture's syndrome is caused by circulating anti-glomerular basement membrane antibodies. Early removal of these antibodies by emergency plasmapheresis is imperative in order to minimize the extent of kidney damage. Emergency plasmapheresis improves the prognosis of patients.

(Choices 2 & 5) The beneficial effect of plasmapheresis is less clear with other causes of pulmonary renal syndromes, although it is sometimes a useful adjunct in patients with Wegener's granulomatosis, severe polyarteritis nodosa, or idiopathic rapidly progressive glomerulonephritis.

(Choice 3) Plasmapheresis is not effective in patients with SLE-associated nephritis.

30. Question **1 points**

A 72-year-old woman with poorly controlled type 2 diabetes mellitus presents to your clinic one week after being discharged from the hospital. She had been admitted with pyelonephritis secondary to a multi-drug resistant organism, and received several days of intravenous antibiotics. Her serum creatinine on admission had been 2 .1 mg/dl. Today it is found to be 4 .9 mg/dl. Urinalysis reveals rare epithelial casts and no white blood cells. FENa is greater than 2%. What antibiotic did she most likely receive during her hospitalization?

1. NafcillinVancomycin
2. Vancomycin
3. Levofloxacin
4. Amikacin ✔
5. Doxycycline

INCORRECT ✖

The correct answer is 4.

This patient has acute renal failure (ARF) in the setting of chronic kidney disease. Of the drugs listed, amikacin is the most likely causative agent. There are several indications that amikacin or another aminoglycoside is the cause of this patient's acute renal failure. First, she had pyelonephritis with a multidrug resistant organism, probably a gram-negative rod.

Aminoglycosides are commonly used in this setting. Second, her urine sediment does not contain any white blood cells. If she had acute interstitial nephritis (AIN), eosinophils and white blood cell casts would be present in her urine. Third, her elevated FEN a is not consistent with a pre-renal etiology of acute renal failure. Aminoglycosides may be used in patients with renal dysfunction, but their serum levels and the patient's renal function must be followed closely. Because of their adverse effects and need for monitoring, aminoglycosides are being used with decreasing frequency, particularly in older patients.

(Choice 1) Nafcillin is a common cause of acute renal failure due to AIN. This drug is used to treat infections caused by methicillin-sensitive Staphylococcus aureus (MSSA). Nafcillin would not have been used to treat multidrug-resistant pyelonephritis and her urinary sediment is not consistent with AIN.

(Choice 2) Vancomycin is used to treat infections with methicillin-resistant S. aureus (MRSA). MRSA pyelonephritis is uncommon but may occur in patients who are chronically ill, are institutionalized, or have indwelling bladder catheters. Vancomycin can be nephrotoxic at high doses and it must be dosed according to serum levels. This woman is more likely to have been infected with a gram-negative organism than a gram-positive one, so is unlikely to have received vancomycin.

(Choice 3) Levofloxacin is a fluoroquinolone antibiotic often used to treat pyelonephritis. Levofloxacin must be renally dosed but is not a common cause of ARF.

(Choice 5) Doxycycline is most often used to treat community acquired pneumonia, some zoonotic infections (e.g., Lyme disease), Chlamydia, and acne. It is not strongly associated with renal dysfunction and is not likely to have been used for multidrug-resistant pyelonephritis.

31. Question

1 points

A 58-year-old man comes to the physician and complains of "problems with erection." He has recurrent and persistently painful erections. His other medical problems include ulcerative colitis, kidney stones, insomnia, depression, hypertension, drug-induced diabetes, obesity and hypercholesterolemia. He does not use tobacco, alcohol, or drugs. He takes prednisone, mesalamine, insulin, 6-mercaptopurine, simvastatin, glyburide, enalapril, trazodone, and fluoxetine. He has no known drug allergies. His vital signs are stable. The general physical examination is unremarkable. Avoidance of which of the following medications could have prevented his condition?

1. Fluoxetine
2. Trazodone ✔
3. Enalapril
4. Glyburide
5. Simvastatin

INCORRECT ✖

The correct answer is 2.

Trazodone is an antidepressant which is mainly used for sleep disturbances. Its disturbing side effect is priapism, which is a persistent, painful erection that develops without sexual stimulation and has a long duration.

Remember the common causes of priapism:

1 . Sickle cell disease and leukemia – usually in children or adolescents

2. Perineal or genital trauma – results in laceration of the cavernous artery

3. Neurogenic lesions – such as spinal cord injury, cauda equina compression, etc.

4. Medications – such as trazodone and prazosin

None of the other medications listed can cause priapism.

(Choice 1) Fluoxetine can lead to sexual dysfunction, resulting in impotence, decreased libido and ejaculatory problems, but it usually does not cause priapism. SSRIs typically cause delayed orgasm; for this reason, these drugs can be used in the treatment of premature ejaculation.

(Choice 3) Most antihypertensive medications (including enalapril) can cause impotence, but do not cause priapism. Nonselective β-blockers such as propranolol usually cause impotence.

(Choice 4) Glyburide also does not cause this side effect.

(Choice 5) Some degree of erectile dysfunction is associated with the use of simvastatin, although this is rarely seen. Priapism is not a side effect of this medication.

32. Question

1 points

A 60-year-old man comes to the physician because of a 2-day history of fever and left-sided scrotal pain. The pain has progressed in severity and it radiates to the flank. His has also had increased urinary frequency and urgency along with dysuria. His temperature is 38.1C (100.8F), blood pressure is 130/75mm Hg, pulse is 86/min, and respirations are 15/min. Physical examination shows left scrotal swelling and a tender scrotal mass; there is no urethral discharge. Rectal examination shows a tender prostate. Laboratory studies show a WBC count of 14, 000/microl with a left shift. Urinalysis shows bacteriuria and pyuria. Which of the following is the most likely organism responsible for this patient's findings?

1. Escherichia coli ✔
2. Pseudomonas
3. Chlamydia trachomatis
4. Gonococcus
5. Staphylococcus aureus

INCORRECT ✖

The correct answer is 1.

Acute epididymitis is characterized by fever, painful enlargement of the testes, and irritative voiding symptoms. It can be either sexually transmitted or non-sexually transmitted. Sexually transmitted acute epididymitis is more common in adults and is associated with urethritis, which causes pain at the tip of the penis and urethral discharge. Non-sexually transmitted acute epididymitis occurs in older persons and is usually associated with a UTI. The findings of the patient presented in this vignette are consistent with non sexually transmitted acute epididymitis.

(Choices 1 & 2) Both E. coli and pseudomonas may cause non-sexually transmitted acute epididymitis but E. coli is the most frequent cause.

(Choices 3 & 4) Chlamydia and gonococcus are the most frequent causes of sexually transmitted acute epididymitis.

(Choice 5) Staphylococcus aureus is highly unlikely as a cause of acute epididymitis in this setting.

33. Question

1 points

A 40-year-old man comes to the physician because of increasing urinary frequency and urgency. He has had these symptoms in the past, but they are more troublesome now. He has also had urinary hesitancy and interruption of flow. His temperature is 37C(98.6F), blood pressure is 130/75mm Hg, pulse is 76/min, and respirations are 15/min. Physical examination shows no abnormalities except increased tone of the anal sphincter and mild periprostatic tenderness. Urinalysis and urine culture shows no abnormalities and expressed prostatic secretions show a leukocyte count of four WBCs/HPF (normal is less than 10 WBCs/HPF). Serum prostate-specific antigen is 2 ng/ml (normal value is less than 4ng/ml). Which of the following is the most likely diagnosis?

1. Chronic bacterial prostatitis
2. Inflammatory chronic prostatitis
3. Non-inflammatory chronic prostatitis ✔
4. Prostatic cancer
5. Acute bacterial prostatitis

INCORRECT ✖

The correct answer is 3.
Patients with non-inflammatory chronic prostatitis are afebrile and have irritative voiding symptoms. Physical examination is unremarkable and urinalysis is normal. Expressed prostatic secretions show a normal number of leukocytes and culture of these secretions is negative for bacteria. There is usually no history of past UTI but voiding abnormalities may be present in the past.
(Choice 1) Patients with chronic bacterial prostatitis are afebrile and have irritative voiding symptoms like urinary frequency, urgency and suprapubic or perineal discomfort. Urinalysis is normal. Expressed prostatic secretions show leukocyte count greater than 10 WBCs/HPF and culture of these secretions grows the colonies of causative pathogen. Rectal examination may show normal or indurated prostate.
(Choice 2) Patients with inflammatory chronic prostatitis are afebrile and have irritative voiding symptoms like urinary frequency, urgency and suprapubic or perineal discomfort. Urinalysis is normal. Expressed prostatic secretions show a leukocyte count greater than 1 O WBCs/HPF and culture of these secretions is negative.
(Choice 4) Prostatic cancer is highly unlikely with normal PSA levels and with normal digital rectal examination in a young patient.
(Choice 5) Patients with acute bacterial prostatitis are febrile with suprapubic or perineal pain. Irritative voiding symptoms like urinary frequency or urgency may be present. Exquisitely tender prostate is noted on rectal examination and urinalysis shows bacteriuria and pyuria.

34. Question **1 points**

A 16-year-old girl presents with a 2-day history of lower abdominal discomfort, burning micturition and increased frequency of urination. She had her first sexual intercourse last week. Her vital signs are stable. Examination shows suprapubic tenderness. Urinalysis shows positive nitrites, positive esterase, 50+ WBC, and many bacteria. Which of the following is the most likely mechanism responsible for her clinical condition?

1. Sexual transmission
2. Hematogenous spread of infection
3. Lymphatic spread of infection
4. Poor genital hygiene
5. Ascending infection ✔

INCORRECT ✖

The correct answer is 5.
This patient's clinical features (i.e., lower abdominal discomfort, burning on micturition, increased frequency of micturition, suprapubic tenderness, significant bacteriuria) are highly suggestive of a urinary tract infection, particularly cystitis.
The urinary tract is generally sterile, with the exception of the distal end of the urethra and meatus. Normally, the enteric gram-negative bacilli that commonly cause UTI do not colonize the vaginal introitus and distal urethra; however, colonization may occur in the presence of predisposing factors (e.g., alteration of the normal vaginal flora by antibiotics, genital infections, contraceptives such as diaphragms and especially spermicide, poor genital hygiene, etc.). It is currently a widely accepted theory that UTIs most commonly occur via the ascending route. In this patient, urethral massage during intercourse most likely facilitated the entry of a small number of periurethral bacteria into the bladder via the ascending route, which consequently resulted in a UTI.
(Choice 1) Sexual intercourse is one of the most important risk factors for developing uncomplicated UTIs in women, due to its mechanical effect of introducing uropathogen into the bladder (honeymoon cystitis). Despite such predisposition, however, the bladder's defense mechanism is generally very competent, and most females suffer only an occasional episode of UTI. Sexual transmission of uropathogen can thus occur, but this does not commonly cause UTIs. Sexual transmission of UTIs from females to male is very rare.
In this patient, although sexual transmission is a possible explanation, an ascending infection (beginning with urethral colonization of enteric organisms via urethral massage) is more plausible and consistent with the clinical features mentioned in the vignette.
(Choices 2 & 3) Hematogenous or lymphatic spread of infection causing UTIs may be seen in patients with distant foci of infection or immunosuppression. These are not very common phenomena.
(Choice 4) Poor personal genital hygiene is a predisposing factor for UTI. It is not the mechanism by which UTIs occur.

35. Question **1 points**

A 68-year-old man is admitted with a diagnosis of left lower lobe pneumonia, and is started on gatifloxacin. He has a long history of diabetes, hypothyroidism, hypercholesterolemia, and hypertension. He also has diabetic retinopathy, peripheral neuropathy, and nephropathy. He has an arterio-venous fistula placed for a possible dialysis. His medications are insulin, furosemide, atorvastatin, metoprolol and levothyroxine. After having his blood drawn for some laboratory studies today, he bleeds persistently. Laboratory studies show:

Hb: 11.5 g/dl
Platelets: 160,000/cm^2
Blood glucose: 178 mg/dl
BUN: 56 mg/dl
Serum creatinine: 3 .5 mg/dl

His baseline creatinine level is between 3.2-3.5 mg/dl. Which of the following is the most likely cause of his bleeding?

1. Disseminated intravascular coagulation
2. Platelet dysfunction ✔
3. Factor VIII deficiency
4. Consumptive coagulopathy
5. Thrombocytopenia

INCORRECT ✖

The correct answer is 2.

Abnormal hemostasis is a common manifestation seen in patients with chronic renal failure. Abnormal bleeding and bruising are characteristic of uremic coagulopathy. Nowadays, ecchymoses and epistaxis are the only major bleeding manifestations seen due to the advent of dialysis; however, GI bleeding, hemopericardium, subdural hematoma, and bleeding from surgical or invasive sites can still occur due to uremic coagulopathy.

The pathogenesis is multifactorial, but the major defect involves platelet-vessel wall and platelet-platelet interaction. Several uremic toxins have been implicated in the pathogenesis of platelet dysfunction seen in chronic renal failure (CRF), the chief among which is guanidinosuccinic acid. Activated partial thromboplastin (a PTT), prothrombin (PT), and thrombin times (TT) are generally normal. Bleeding time (BT) is reflective of platelet function, and is usually prolonged. The platelet count is normal, but there is platelet dysfunction that causes bleeding.

A number of agents such as desmopressin (DDAVP), cryoprecipitate, and conjugated estrogens have been used to correct the coagulopathy in uremic patients. DDAVP increases the release of factor VIII:von Willebrand factor multimers from endothelial storage sites.

(Choices 1, 3, 4 & 5) Disseminated intravascular coagulation, factor VIII deficiency, consumptive coagulopathy, and thrombocytopenia are not common causes of bleeding in uremic patients. Furthermore, this patient's normal platelet count makes the diagnosis of DIC unlikely.

36. Question

1 points

A 64-year-old man is scheduled for hemodialysis due to end stage renal disease. He has a several year history of hypertension, diabetes, coronary artery disease, hypercholesterolemia, peripheral vascular disease, gout, and diverticulosis. Six months ago, he was admitted for urosepsis.

Recently, his hemoglobin has ranged between 8.5 to 9.5 g/dl. He has already been on iron therapy, and now you are considering erythropoietin injections twice weekly. Which of the following is most likely to be seen following erythropoietin therapy?

1. Worsening of his hypertension ✔
2. Increase in insulin requirement
3. Increased susceptibility to infections
4. Deterioration in renal function
5. Flare-up of gout

INCORRECT ✖

The correct answer is 1.

Normochromic normocytic anemia due to erythropoietin deficiency is very common in patients with end stage renal disease. Recombinant erythropoietin is the treatment of choice; however, iron supplements should be given before erythropoietin in patients with evidence of iron deficiency. All patients with chronic renal failure and hematocrit < 30% (or hemoglobin < 10 g/dl) are candidates for recombinant erythropoietin therapy after iron deficiency has been ruled out. Erythropoietin is also indicated in hemodialysis patients who have symptoms attributed in part to anemia.

Some of the most common side effects of erythropoietin therapy are:

1. Worsening of hypertension: This is seen in approximately 30% of patients. 20-50% of patients receiving I .V. erythropoietin will have more than a 10 mmHg rise in diastolic BP. This rise in BP is less common after the S.C. route of erythropoietin, as compared to the 1.V. route. Even hypertensive encephalopathy can occur when there is a rapid rise in BP. Exactly how erythropoietin causes hypertension is not well understood. Treatment includes fluid removal (by dialysis) and use of anti hypertensive drugs (β blockers and vasodilators are preferred). Prevention involves slowly raising the hematocrit, with a goal hematocrit of 30-35%.
2. Headaches: These are seen in 15% of patients.
3. Flu-like syndrome: This is seen in 5% of patients. It is responsive to anti-inflammatory drugs, and is less commonly seen with subcutaneous erythropoietin administration.
4. Red cell aplasia: This is a rare, but potential side effect.

(Choices 2, 3, 4 & 5) Erythropoietin use is not associated with an increase in insulin requirement, increased susceptibility to infections, deterioration in renal function, and flare-up of gout.

37. Question **1 points**

A 30-year-old woman comes to the physician due to the recent onset of occipital headaches. She has taken acetaminophen several times, but the pain returns. She has no fever or visual problems. She has not had similar episodes in the past. She has no history of serious illness. Her temperature is 36.1 C (98F), blood pressure is 160/90 mm Hg, pulse is 88/min, and respirations are 16/min. Physical examination shows a right sided renal bruit. Which of the following is the most appropriate treatment for this patient's condition?

1. ACE inhibitors
2. Furosemide
3. Angioplasty with stent placement ✔
4. Surgery
5. Oral prednisone

INCORRECT ✖

The correct answer is 3.

This patient's presentation (i.e., headache, elevated blood pressure, renal bruit) is highly suggestive of renovascular hypertension secondary to renal artery stenosis. The usual cause of renal artery stenosis in young adults is fibromuscular dysplasia. In older patients, the cause is usually an atheromatous plaque. The goals of treatment are to decrease blood pressure and restore perfusion to the ischemic kidney. Interventional therapy is more effective than medical management alone; hence, angioplasty with stent placement is the best treatment option for this patient.

(Choice 1) Medical therapy alone is only partially effective. Although ACE inhibitors with diuretics offer good control of blood pressure, such drugs are unable to preserve the deteriorating kidney function for too long. Medical therapy alone is thus reserved for older patients with renal artery stenosis (due to atherosclerosis) who are not good candidates for surgery, or refuse surgery. ACE inhibitors are contraindicated in bilateral renal artery stenosis.

(Choice 2) Furosemide is a loop diuretic that can help decrease blood pressure, but this patient would benefit more from angioplasty with stent placement.

(Choice 4) For patients with fibromuscular dysplasia, surgery is recommended only if angioplasty fails. Angioplasty with stent placement remains the treatment of choice in this patient.

(Choice 5) Oral prednisone has no role in the treatment of this patient.

38. Question **1 points**

A 35-year-old woman who recently emigrated from Russia comes to the physician because of hematuria. She has a history of frequent headaches. Extensive evaluation did not reveal the cause of her headaches. They occur almost every day, and she tried various analgesics to relieve them. Her family history is significant for hypertension and diabetes mellitus. She does not use tobacco, alcohol, or drugs. Her blood pressure is 120/70 mm Hg and heart rate is 80/min. Physical examination shows no abnormalities but Urinalysis shows numerous unchanged red blood cells/hpf. Which of the following is the most likely cause of this patient's condition?

1. Malignancy
2. Glomerular injury
3. Papillary necrosis ✔
4. Infection
5. Nephrolithiasis

INCORRECT ✖

The correct answer is 3.

The clinical scenario described (a woman with chronic headaches presenting with painless hematuria) is very typical for analgesic nephropathy. The prevalence of analgesic nephropathy in the general population is controversial, but it is probably underestimated. It is believed that several years of analgesic abuse is required to induce this condition characterized by chronic tubulointerstitial damage. Hematuria in these patients is commonly due to renal papillary necrosis. It results from papillary ischemia induced by analgesic mediated vasoconstriction of medullary blood vessels (vasa recta). Sometimes hematuria is prominent, and clots may form causing renal colic.

(Choice 1) Malignancy may cause painless hematuria, but it is less likely in this young woman.

(Choice 2) Glomerulopathy is typically accompanied by more characteristic changes on urinalysis (deformed red blood cells, significant proteinuria and casts).

(Choice 4) Infection presents with dysuria, inflammatory changes on urinalysis and sometimes fever.

(Choice 5) Renal colic accompanied by hematuria is typical for nephrolithiasis.

39. Question

1 points

A 73-year-old man presents to the emergency department complaining of lower abdominal pain and nausea. He denies any vomiting or diarrhea, and his last bowel movement was two days ago. The patient also notes that several days ago he began taking amitriptyline for chronic neck pain. He does not smoke or consume alcohol. On physical examination, his blood pressure is 160/70 mmHg

and his heart rate is 100/min. His lung fields are clear to auscultation. Palpation of the abdomen reveals fullness and tenderness along the midline below the umbilicus. Which of the following is the best initial management for this patient?

1. Abdominal CT scan
2. Upright abdominal x-ray
3. Barium enema
4. Broad spectrum antibiotics
5. Urinary catheterization ✔
6. IV fluids, analgesics, and observation

INCORRECT ✖

The correct answer is 5.

This patient presents with abdominal pain and suprapubic fullness several days after starting amitriptyline for chronic pain. This presentation is consistent with amitriptyline-induced urinary retention. Amitriptyline is a tricyclic antidepressant with anticholinergic properties. Because both the detrusor muscle and urethral sphincter are under muscarinic control, anticholinergic agents will reduce detrusor contraction and prevent urethral sphincter relaxation. The result is urinary retention.

Urinary catheterization would serve two purposes in this case. First, it can document a postvoid residual bladder volume of greater than 50 ml, which is considered diagnostic of urinary retention. Plus, catheterization will provide symptomatic relief as it drains urine from the bladder. The patient should also discontinue amitriptyline therapy.

(Choice 1) An abdominal CT scan would reveal a distended bladder in this patient and may also show hydronephrosis. However, CT scans are much more expensive and time consuming than urinary catheterization and will not provide symptomatic relief.

(Choice 2) An upright abdominal x-ray may show a distended bladder but it is not a reliable test for evaluating urinary retention. Abdominal x-rays are especially helpful for diagnosing ileus or small bowel obstruction.

(Choice 3) Barium enemas are used to diagnose luminal abnormalities of the colon, like colon cancer or diverticulosis.

(Choice 4) Broad-spectrum antibiotics are appropriate when a urinary tract infection with urinary retention is suspected. This patient does not complain of fever, chills, or dysuria, making infection less likely.

(Choice 6) IV fluids, analgesics, and observation are the treatment for nephrolithiasis, or kidney stones. Patients with kidney stones typically present with intense flank pain and hematuria, not suprapubic fullness. IV fluids would actually exacerbate this particular patient's symptoms.

40. Question **1 points**

A 55-year-old woman comes to the physician for an annual physical examination. She has no new complaints, except fatigue. She has an 8-year history of chronic low back pain; severe degenerative joint disease has been documented on MRI. She had an anterior wall myocardial infarction four years ago. Her current medications include naproxen, acetaminophen, oxycodone, aspirin, atenolol, and simvastatin. Her blood pressure is 130/80 mm Hg and pulse is 72/min. Laboratory studies show:

Hb: 10 g/dl
WBC: 6,000/cm^2
Blood sugar: 82 mg/dl
BUN: 36 mg/dl
Serum creatinine: 2.0 mg/dl

Urinalysis:

Protein: 2+
Glucose: Absent
RBC: Absent
WBC: 10-15/HPF
Nitrite: Negative
Esterase: Negative
Sediment: WBC casts

Serum protein electrophoresis is negative for monoclonal gammopathy. Two years ago, her BUN level was 22 mg/dl, and creatinine level was 1.6 mg/dl. Which of the following is the most likely pathology involved in this patient's renal failure?

1. Acute tubular necrosis
2. Chronic glomerulonephritis
3. Tubulointerstitial nephritis ✔
4. Recurrent pyelonephritis

INCORRECT ✖

The correct answer is 3.

Analgesic nephropathy is the most common form of drug-induced chronic renal failure. It accounts for 3-5% of end stage renal disease in the USA, and is most commonly seen in females (peak at age 50-55 years) who habitually use combined analgesics (e.g., aspirin and naproxen). It is generally seen after cumulative ingestion of 2-3 kg (4.4-6.6 lbs) of the index drug. Papillary necrosis and chronic tubulointerstitial nephritis are the most common pathologies seen. Polyuria and sterile pyuria (WBC casts may also be seen) are early manifestations. Microscopic hematuria and renal colic may occur following sloughing of renal papilla. Hypertension, mild proteinuria, and impaired urinary concentration commonly occur

as the disease advances. In severe cases, nephrotic range proteinuria can be seen. Patients with chronic analgesic abuse are also more likely to develop premature aging, atherosclerotic vascular disease, and urinary tract cancer.
(Choice 1) Acute tubular necrosis causes acute renal failure, rather than insidious progression of renal dysfunction. It is most commonly seen in ischemic or nephrotoxic acute renal failure. Muddy brown granular casts are characteristic.
(Choice 2) Glomerulonephritis manifests as nephritic syndrome. Hematuria (RBC casts), edema, hypertension, and proteinuria are characteristic.
(Choice 4) Chronic pyelonephritis can cause chronic tubulointerstitial nephritis; however, it is associated with a history of recurrent urinary tract infections and symptoms such as fever, back pain, and dysuria.

41. Question

1 points

A 56-year-old man develops oliguria three days after having kidney transplantation. His postoperative course was uncomplicated. His blood pressure is 160/100 mm Hg and heart rate is 90/min. Palpation of the transplant reveals mild tenderness. Laboratory studies show:

Serum sodium: 145 mEq/L
Serum potassium: 5.5 mEq/L
Serum calcium: 8.6 mg/dl
Serum creatinine: 3.2 mg/dl
BUN: 30 mg/dl

His serum cyclosporine level is normal. Renal ultrasonography does not detect dilatation of the calyces. Biopsy of the transplant shows heavy lymphocyte infiltration and vascular involvement with swelling of the intima. Which of the following is the most appropriate next step in management?

1. Decrease the dose of cyclosporine
2. Give IV steroids ✔
3. Order ureterography
4. Administer IV diuretics
5. Prepare for surgery

INCORRECT ✖
The correct answer is 2.
Renal transplant dysfunction in the early post-operative period manifests as oliguria, hypertension, and increased creatinine/BUN. It can be explained by a number of causes,

which include ureteral obstruction, acute rejection, cyclosporine toxicity, vascular obstruction, acute tubular necrosis, etc.
In this case, the patient's clinical signs, symptoms, and laboratory findings are suggestive of acute rejection. Rapid institution of anti-rejection therapy, including high-dose IV steroids, is important.
(Choice 1) Cyclosporine toxicity does not present with graft tenderness. The transplant's function is usually restored when the dose of cyclosporine is decreased. In this case, the patient's clinical features (i.e., normal serum cyclosporine level, renal biopsy findings) are more consistent with acute rejection.
(Choice 3) Renal ultrasound helps to rule out ureteral obstruction.
(Choice 4) Administration of IV diuretics may be employed in acute tubular necrosis, but the patient's renal biopsy findings are not consistent with this condition.
(Choice 5) Surgery is not appropriate in this case.

42. Question

1 points

A 50-year-old man comes to the physician for a routine follow-up visit. He has hypertension, diabetes mellitus, secondary hyperparathyroidism, and end-stage renal disease. He has been on hemodialysis for the past three years. He was admitted three months ago for line sepsis, which was treated with antibiotics. He had a right below-the-knee amputation two years ago following a non-healing foot ulcer. Physical examination shows a right carotid bruit. If this patient dies within the next five years, what would be the most likely cause of his death?

1. Cardiovascular disease ✔
2. Stroke
3. Infection
4. Cancer
5. Withdrawal from dialysis

INCORRECT ✖

The correct answer is 1.

Cardiovascular disease is the most common cause of death in the general population, but the rates are declining. Interestingly, this recent trend has not been observed in the dialysis population. Cardiovascular disease remains as the most common cause of death in dialysis patients. It accounts for approximately 50% of deaths in this group of patients. Of these deaths, 20% are attributed to acute myocardial infarction and approximately 60% to sudden cardiac deaths.
The following risk factors are associated with cardiovascular disease in dialysis patients:

Risk factors not related to dialysis: A large number of patients on dialysis already have multiple risk factors for cardiovascular disease. These are:

- Hypertension (96%)
- Diabetes (54%)
- Low serum HDL cholesterol (33%)
- Left ventricular hypertrophy by ECG criteria (22%)
- Coronary artery disease: Approximately 75% of patients with total end-stage renal disease have at least a 50% narrowing of at least one coronary artery.
- Increased age: The average age of patients at the start of dialysis is about 60 years.

Additional risk factors due to end stage renal disease and dialysis are:

- End stage renal disease: This, by itself, is an independent risk factor for cardiovascular disease.
- Anemia.
- Metabolic abnormality, particularly hyperphosphatemia, and increased PTH levels.
- Increased homocysteine levels: These are due to impaired metabolism and decreased removal.
- Accelerated atherogenesis in dialysis patients: This is due to enhanced oxidant stress due to uremia and bio-incompatible renal replacement therapies.
- Increased calcium intake (calcium is given to correct hyperphosphatemia in dialysis patients J:
- This enhances coronary artery calcification.
- Inhibition of NO: This is a common finding in dialysis patients, and can cause vasoconstriction and hypertension.

(Choice 2) Stroke can occur secondary to cardiovascular disease; thus, cardiovascular disease remains as the most common cause of death in dialysis patients.
(Choice 3) Infection is also a common cause of death in dialysis patients. It accounts for approximately 15-20% of deaths, and is most commonly related to vascular access (line sepsis J.
(Choice 4) Patients on dialysis are not at increased risk for any cancer.
(Choice 5) Withdrawal from dialysis accounts for 20% of deaths in dialysis patients.

43. Question

1 points

A 15-year-old boy comes to the physician because of hematuria and lower abdominal pain. This is his third episode of hematuria in the past 2 years. He has a family history of renal disease. His temperature is 37 .1 C (98.9F), blood pressure is 140/90 mm Hg, pulse is 80/min, and respirations are 14/min. Examination shows mild sensorineural deafness bilaterally. Urinalysis shows hematuria and proteinuria. Laboratory studies show BUN of 50 mg/dl and serum creatinine of 3 .1 mg/dL; serum complement levels are normal. Renal biopsy shows foam cells, and immunofluorescence shows no immunoglobulins or complement. Electron microscopy shows alternating areas of thinned and thickened capillary loops with splitting of GBM. Which of the following is the most likely diagnosis?

1. Alpert's syndrome ✔
2. Thin basement membrane disease
3. Acute post infectious glomerulonephritis
4. Anti-glomerular basement membrane disease
5. Benign recurrent hematuria

INCORRECT ✖

The correct answer is 1.

The above vignette illustrated the classic presentation of Alpert's syndrome. This is a familial disorder which usually presents in childhood as recurrent gross hematuria and proteinuria. Sensorineural deafness usually occurs. Electron microscopy findings include alternating areas of thinned and thickened capillary loops with splitting of the glomerular basement membrane (GBM).

(Choice 2) Thin basement membrane disease is also a familial disorder, but it presents in adulthood as microscopic hematuria without proteinuria. Renal biopsy reveals a markedly thinned basement membrane.

(Choice 5) Benign recurrent hematuria is asymptomatic. Renal biopsy is normal in most cases. This condition has an excellent prognosis.

44. Question

1 points

A 25-year-old woman comes to the physician because of a 3-day history of burning micturition and increased urinary frequency. She has suprapubic discomfort. She denies having unusual vaginal discharge. She has been sexually active and monogamous for the past 4 years with her husband. Her temperature is 37.1 C (98.9 F), blood pressure is 110/70 mm Hg, pulse is 68/min, and respirations are 15/min. Examination shows suprapubic tenderness without flank tenderness. The rest of the examination is normal.

Urinalysis shows:

Specific gravity: 1.020
Blood: Trace
Glucose: Negative
Ketones: Negative
Leukocyte esterase: Positive
Nitrites: Positive
WBC: 40-50/hpf
RBC: 6-10/hpf
Bacteria: 50+

Which of the following is the most appropriate next step in management?

1. Urine culture
2. Oral trimethoprim-sulfamethoxazole ✔
3. Oral ciprofloxacin
4. Oral nitrofurantoin
5. Intravenous trimethoprim-sulfamethoxazole

INCORRECT ✖

The correct answer is 2.

This patient's clinical features (i.e., dysuria, urinary frequency, suprapubic discomfort, no unusual vaginal discharge or high-risk sexual behavior) and urinary findings (i.e.,, bacteriuria, pyuria) establish the diagnosis of acute, uncomplicated cystitis. In such cases, routine urine cultures are not indicated. Oral trimethoprim sulfamethoxazole is the preferred empiric treatment.

(Choice 1) Urine culture is done when the findings are not typical for acute cystitis or when the patient is suffering from a complicated infection.

(Choices 3 & 4) Oral ciprofloxacin or nitrofurantoin is not a first-line empiric therapy for uncomplicated acute cystitis, except when there is resistance or an allergy to trimethoprim-sulfamethoxazole.

(Choice 5) IV trimethoprim-sulfamethoxazole is not appropriate for acute uncomplicated cystitis as there are no systemic signs of toxicity.

45. Question

1 points

A 57-year-old woman is admitted to the ICU after being involved in a highway motor vehicle accident. She was hypotensive at the scene and received 7 liters of fluids, which included crystalloids, blood, and fresh frozen plasma. She apparently had significant external blood loss from multiple fractures and skin loss. She undergoes surgery, after which she is transferred to the ICU and receives continuous IV fluids and vasopressor. Her laboratory studies 24 hours after the accident show the following:

Hb: 9.5 g/dl
WBC: 15,000/cm^2
Platelets: 130,000/cm^2
BUN: 34 mg/dl Serum
Creatinine: 2 .2 mg/dl

Which of the following is the most likely microscopic finding on urinalysis?

1. Broad cast
2. Muddy brown cast ✔
3. RBC casts
4. WBC casts
5. Fatty casts

INCORRECT ✖

The correct answer is 2.

The clinical picture of this patient is highly suggestive of acute tubular necrosis (ATN) following hypovolemic shock. Her serum BUN and Cr ratio is less than 20: 1 . Other findings that support this diagnosis are:

1. Urine osmolality of 300-350 mOsm/L (but never <300)
2. Urine Na of >20 mEq/L
3. FE—Na –> 2%

Prolonged hypotension from any cause can lead to ATN. The hallmark findings on urinalysis are muddy brown granular casts consisting of renal tubular epithelial cells; this is a nonspecific, but very sensitive finding for ATN.

(Choice 1) Broad casts are seen in patients with chronic renal failure (CRF). These arise in the dilated tubules of enlarged nephrons that have undergone compensatory hypertrophy in response to the reduced renal mass. Waxy casts, which are shiny and translucent, are also generally seen in chronic renal disease.

(Choice 3) RSC casts are indicative of glomerular disease or vasculitis.

(Choice 4) WBC casts are definitive evidence that urinary WBCs originate in the kidney. These are seen in cases of interstitial nephritis, pyelonephritis, etc.

(Choice 5) Fatty casts are seen in conditions causing nephrotic syndrome. Hyaline casts are composed almost entirely of protein and pass unchanged along the urinary tract; these may be seen in asymptomatic individuals and in patients with pre-renal azotemia.

46. Question **1 points**

A 56-year-old male with a long history of diabetes mellitus complains of nocturnal urinary frequency, occasional dribbling and difficulty completing his stream. His past medical history is significant for a myocardial infarction two years ago and moderately decreased visual acuity. On physical examination, his blood pressure is 160/100 mm Hg and his heart rate is 70/min. There is a carotid bruit auscultated on the left side as well as trace ankle edema. Post-void bladder catheterization yields 60 ml of urine. Dipstick urinalysis reveals 2+ protein and 3-4 WBC/hpf. The patient's serum creatinine level is 2.4 mg/dl. Which of the following is the most likely cause of his renal dysfunction?

1. Ascending infection
2. Obstructive uropathy
3. Microangiopathy ✔
4. Renal hypoperfusion
5. Cystic kidney disease

INCORRECT ✖

The correct answer is 3.

This diabetic patient has renal insufficiency (given his elevated serum creatinine) and a moderate level of proteinuria. The most likely explanation for the abnormalities on dipstick urinalysis is microangiopathy related to diabetic glomerulosclerosis. In diabetic patients with moderate proteinuria and progressive renal insufficiency, diabetic glomerulosclerosis is commonly responsible. Approximately 50% of type 1 and type 2 diabetics develop moderate or severe proteinuria over the course of the disease. In general, the proteinuria becomes evident 12 to 22 years after the clinical onset of diabetes and progresses to chronic renal failure and end-stage renal disease within the subsequent 4 to 5 years. However, this sort of overt proteinuria is preceded by mild or trace protein leakage into the urine, termed "microalbuminuria," which may actually become detectable within a few years of the onset of diabetes.

(Choice 2) The above patient does have some bladder outlet obstruction as evidenced by his nocturnal urinary frequency, dribbling, and postvoid residual greater than 50cc. This is most likely the result of benign prostatic hypertrophy (BPH), the commonest cause of urinary retention in males over age 50. However, mild BPH would not cause renal insufficiency unless a complete bladder outlet obstruction was present.

(Choice 4) Renal hypoperfusion can cause pre-renal azotemia, but this is unlikely in this patient as he has an elevated mean arterial pressure. Furthermore, renal hypoperfusion would not necessarily cause proteinuria.

(Choice 5) Adult polycystic kidney disease (APKD) can cause hypertension and progressive renal insufficiency, but the associated proteinuria is usually minimal or mild. Additionally, flank and/or abdominal pain and hematuria are generally present.

47. Question **1 points**

A 34-year-old man is being evaluated for possible end-stage renal disease. He has a long history of diabetes, type 1 . He previously developed chronic renal insufficiency despite being on enalapril and insulin. His renal function is getting worse day by day. A nephrologist is currently managing his

renal condition. Which of the following long-term treatments would give the best survival rate for this patient?

1. Hemodialysis
2. Peritoneal dialysis
3. Renal transplantation from a cadaver
4. Renal transplantation from a living related donor ✔
5. Renal transplantation from a living unrelated donor

INCORRECT ✖

The correct answer is 4.

End stage renal disease is a progressive condition that is fatal if left untreated. Once end stage renal disease develops, there are only two treatment options available: dialysis or renal transplantation. The choice depends on the patient and co-morbid conditions; however, if both options are available, renal transplantation is preferred, as it is associated with better survival and quality of life.

The advantages of renal transplantation over dialysis are:

1. Better survival and quality of life.
2. Anemia, bone disease, and hypertension persist in spite of dialysis; these are better controlled with transplantation.
3. Transplant patients have a return of normal endocrine, sexual, and reproductive functions, and enhanced energy levels; thus, returning to fulltime employment and more strenuous physical activity is possible.
4. In diabetics, autonomic neuropathy persists or worsens after dialysis; whereas, it stabilizes or improves with transplantation.
5. Expected survival rate after transplantation is 95% at one year and 88% at five years.

(Choices 1 & 2) Dialysis options include hemodialysis (home or in-center) or peritoneal dialysis (chronic ambulatory or cyclic peritoneal dialysis). In the US, 85% of patients have in-center hemodialysis, 15% have peritoneal dialysis, and approximately 1 % have home hemodialysis. The choice depends on the patient. Peritoneal hemodialysis provides the patient with more control and mobility, but the risk of peritonitis is high. The five-year survival rate in non-diabetic patients who are on dialysis is 30-40%; whereas, in diabetics, it is 20%.

(Choices 3 & 5) The major disadvantages of renal transplantation are difficulty in finding a donor, surgical risk and cost, and side effects of immunosuppression. Transplantation from a living related donor has the least graft rejection and best graft survival, followed by a living non-related donor, and cadaver graft.

48. Question **1 points**

A 34-year-old woman comes to the physician's office because of occasional headaches and palpitations. She has no other medical problems. She takes no medications. She smokes one and a half packs of cigarettes daily. Her blood pressure is 170/100 mm Hg in both arms, and heart rate is 80/min. Physical examination shows bilateral flank masses. Laboratory studies show:

Serum sodium: 140 mEq/L
Serum potassium: 4 .4 mEq/L
BUN: 26 mg/dL
Serum creatinine: 1 .3 mg/dL

Urinalysis shows 10-12 red blood cells/hpf, but otherwise shows no abnormalities. The most likely complication that can occur in this patient is which of the following?

1. Liver necrosis
2. Intracranial aneurysms ✔
3. Restrictive cardiomyopathy
4. Pancreatic cancer
5. Aortic dissection

INCORRECT ✖
The correct answer is 2.
This patient most likely has autosomal dominant polycystic kidney disease (ADPKD). The clues to the correct diagnosis are hypertension, palpable bilateral abdominal masses and microhematuria. Intracranial berry aneurysm is a common complication, and is seen in 5 to 10% of the cases. Although such aneurysms are common and dangerous when coupled with hypertension, routine screening for intracranial aneurysms is not recommended.
The other major extra-renal complications of ADPKD are:
1 . Hepatic cysts – most common extrarenal manifestations of ADPKD
2. Valvular heart disease – most often mitral valve prolapse and aortic regurgitation
3. Colonic diverticula
4. Abdominal wall and inguinal hernia
(Choice 1) Liver necrosis is a rare complication of the disease.
(Choice 5) Aortic dissection can occur as a rare complication of severe hypertension, not polycystic kidney disease itself.
(Choices 3 & 4) Restrictive cardiomyopathy and pancreatic cancer are not associated with polycystic kidney disease.

49. Question **1 points**

A 30-year-old woman comes to the physician due to several weeks history of generalized edema, fatigue, and decreased appetite. She has no other medical problems. She takes no medications. She does not use tobacco, alcohol, or drugs. Her temperature is 36.7C (98F), blood pressure is 110/70 mm Hg, pulse is 80/min, and respirations are 18/min. Physical examination shows generalized edema. Laboratory studies show a low serum albumin level. HBsAg is positive, and liver function tests are abnormal. Urinalysis shows +4 proteinuria and microhematuria. Which of the following is the most likely diagnosis?

1. Membranoproliferative glomerulonephritis
2. Minimal change disease
3. Focal segmental glomerulosclerosis
4. Diffuse proliferative glomerulonephritis
5. Membranous glomerulonephritis ✔

INCORRECT ✖

The correct answer is 5.

The most probable diagnosis of this patient presenting with nephrotic syndrome is membranous glomerulonephritis. It is well known that hepatitis B infection is associated with glomerular disease, especially membranous glomerulonephritis. The pathophysiology of this condition is not completely clear, but probably includes immune complex-induced glomerular damage. Immune complexes composed of hepatitis B antigens and antibodies have been implicated. Patients are at high risk of developing thrombotic complications such as renal vein thrombosis, pulmonary embolism, etc.

(Choice 1) Hepatitis C infection is often associated with cryoglobulinemia and some cases of membranoproliferative glomerulonephritis (MPGN).

(Choice 2) Minimal change disease is associated with Hodgkin's lymphoma.

(Choice 3) Collapsing and focal segmental glomerulosclerosis is seen in HIV patients.

(Choice 4) Diffuse proliferative glomerulonephritis is the severe form of glomerulonephritis seen in patients with systemic lupus erythematosus.

50. Question

1 points

A 62-year-old man presents to the emergency department with severe back pain that began suddenly after he attempted to lift a heavy box. He says the pain radiates down his right thigh and leg and that coughing and moving make the pain 'unbearable.' The patient also complains of an inability to urinate since the pain started. On physical examination, he has no focal lower extremity

weakness or numbness, and pinprick testing in the perianal area elicits a quick spasm of the anal sphincter. Rectal exam reveals an enlarged, smooth, nontender prostate. Which of the following best explains this patient's urinary retention?

1. Severe pain ✔
2. Nerve root injury
3. Detrusor instability
4. Hypertonic bladder
5. Urethral injury

INCORRECT ✖

The correct answer is 1.

This patient appears to have herniated an intervertebral disk, most likely L4/L5, and is most likely suffering from spinal nerve impingement. Classic symptoms of disk prolapse include unilateral radicular pain in a dermatomal distribution. Back tenderness due to spasm of the paraspinous muscles is common, and symptoms are usually worsened with straight leg raise testing. Fortunately, this patient has no saddle anesthesia and his sphincter tone is intact, so cauda equina syndrome is an unlikely explanation for his urinary retention. He does have benign prostatic hypertrophy (BPH) on physical examination, meaning that he likely needs to Valsalva in order to initiate and maintain a urinary stream. Because he has severe pain with coughing and movement, he is probably unable to generate sufficient intraabdominal pressure to overcome the resistance to flow caused by his BPH – hence urinary retention secondary to pain.

(Choice 2) A large midline disk herniation can cause nerve root injury known as cauda equina syndrome, a condition characterized by bladder atony with overflow incontinence, bilateral sciatica, saddle anesthesia and loss of anal sphincter tone.

(Choice 3) Detrusor instability, also known as urge incontinence, typically presents with incontinence preceded by sudden urinary urgency. It is caused by unregulated spontaneous contractions of the bladder that are unresponsive to cortical inhibition.

(Choice 4) Hypertonic bladder presents with constant urine dribbling due to unremitting contraction of the bladder and urethral sphincter hypotonia.

(Choice 5) Urethral injury typically occurs following trauma. Patients present with blood at the urethral meatus and perineal ecchymosis and hematoma.

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